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ESSAYS

ON

VARIOUS SUBJECTS

OF

MEDICAL SCIENCE.

MEDICAL ESSAYS.

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ESSAYS

ON

VARIOUS SUBJECTS

OF

MEDICAL SCIENCE.

BY

DAVID HOSACK, M.D. F.R.S. L.&E.

PROFESSOR OF THE THEORY AND PRACTICE OF PHYSIC AND CLINICAL
MEDICINE IN THE UNIVERSITY OF THE STATE OF NEW-YORK:
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Southern District of New-York, ss.

BE IT REMEMBERED, That on the tenth day of April, in the forty-eighth year of the Independence of the United States of America, David Hosack, of the said District, has deposited in this office the title of a Book, the right whereof he claims as author, in the words following, to wit:

" Essays on Various Subjects of Medical Science. By David Hosack, M. D Professor of the Theory and Practice of Physic and Clinical Medicine in the University of the State of New-York; and one of the Physicians of the New-York Hospital."

In conformity to the Act of the Congress of the United States, entitled, " An Act for the encouragement of Learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the times therein mentioned." And also to an Act, entitled " an Act, supplementary to an Act, entitled an Act for the encouragement of Learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the times therein mentioned, and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints "

JAMES DILL,
Clerk of the Southern District of New-York.

TO

SIR GILBERT BLANE, BART.

F. R. S. S. LOND. EDINB. AND GOTTING.
MEMBER OF THE IMPERIAL ACADEMY OF SCIENCES OF ST. PETERSBURG,
AND FIRST PHYSICIAN TO THE KING.

My Dear Sir,

As an expression of my grateful feelings for the kind attentions I personally received from you, when prosecuting my medical studies in London in 1793-4, and the uninterrupted continuation of that friendship, which you have manifested in the correspondence with which you have honoured me, since that period, I beg leave to dedicate to you the present volumes.

But to acknowledge a debt of gratitude, is not the only motive that actuates me in this address; it is to bear my testimony to the value of those truths which your distinguished talents and unremitting labours in science and in medicine have established.

Soliciting your acceptance of this tribute of my attachment and respect,

I am, my dear Sir,
your humble servant,
DAVID HOSACK.

New-York, April 1st, 1824.

2605

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No. I.

OBSERVATIONS ON VISION.

Read before the Royal Society of London, May 1st, 1794, and published in their Transactions of the same year.[*]

(See the annexed Engravings.)

By what power is the eye enabled to view objects distinctly at different distances? As the pupil is enlarged or diminished according to the greater or less quantity of light, and, in a certain degree, to the distance of the object, it would readily occur that these different changes of the pupil would account for the phenomena in question. Accordingly, anatomists and philosophers, who have written upon this subject, have generally had recourse to this explanation.

---

[*] When the author was prosecuting his medical studies in London, in 1794, the following paper was written, and submitted to the private examination of Sir Joseph Banks, Dr. Andrew Marshall, Dr. George Pearson, the late Dr. Robert Willan, Dr. William Woodville, and the late celebrated opticians, Mr. George Adams and Mr. John Ramsden. By their advice it was communicated to the Royal Society, and was published in the Philosophical Transactions for the same year. It has also been republished entire in the abridgment of the Transactions by Drs. Hutton, Shaw, and Pearson, vol. 17. Since that time various publications have appeared upon the same subject. In some of these, the writers, passing over in profound silence the observations of the author, have taken to themselves the credit of having given the first illustration of the manner in which the external muscles of the eye operate in adapting it to the different distances of objects. He excepts from this imputation the late Dr. George Gregory and William Nicholson, Esq. The former, in his Economy of Nature, and the latter, in his Journal, have candidly noticed, and liberally acknowledged the claims of those who have preceded them. The same candour is manifested by Dr. Hutton in his recent elaborate work, the Philosophical and Mathematical Dictionary.

Amusing myself with these changes of the pupil, as a matter of curiosity, by presenting to the eye different objects at different distances, I soon perceived that its contraction and dilatation were irregular and more limited than had been supposed: *i. e.* that approaching the object nearer the eye, within a certain distance, the pupil not only ceased to contract, but became again dilated; and that beyond a few yards distance, it also ceased to dilate: these circumstances immediately occurred as objections to the above explanation; for were it from the contraction and dilatation of the iris alone that we see objects at different distances, I naturally concluded it should operate regularly to produce its effects; but if to view an object at a few yards distance it be enlarged to the utmost extent, surely it must of itself be insufficient to view one at the distance of several miles; for example, the heavenly bodies.

Another difficulty here presents itself: in viewing the sun, instead of dilating, according to the distance, it contracts, obeying rather the quantity, or intensity of the light, than the distance of the object. Knowing no other obvious power in the eye itself of adapting it to the different distances of objects, it occurred to me to inquire, whether the combined action of the external muscles could

Plate 1st to Face Page 11.

Fig. 1.

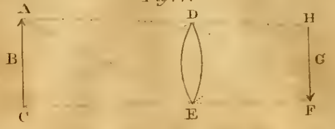
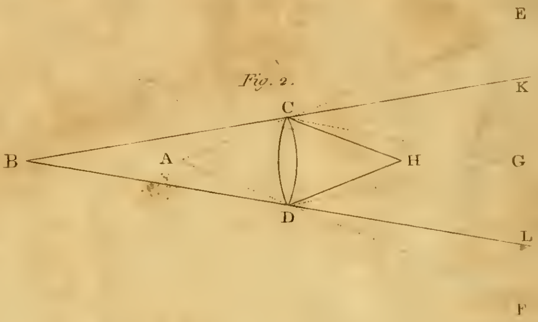


Fig. 2.



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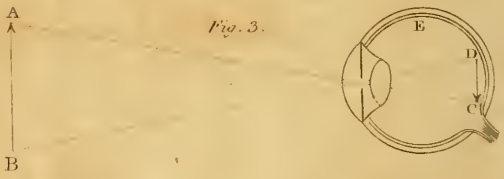

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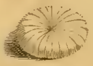


Fig. 5.

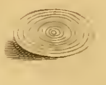
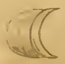


Fig. 6.



not have this effect. I first proposed this query to an optician of eminence in London,* and who has written expressly on this subject. I repeated the same question to a celebrated teacher of anatomy.† Encouraged by their replies, I have since attended more particularly to the subject, and hope my inquiries have not been altogether unsuccessful. As introductory to a more distinct view of what I have to advance, it appears necessary to premise the following observations, relative to those general laws of vision which are more particularly connected with this part of the subject, and to which we shall have occasion of frequent reference.

1st. Let A B C, (see plate 1st, fig. 1.) be an object placed before the double convex lens D E, at any distance greater than the radius of the sphere whereof the lens is a segment; the rays which issue from the different points of the object, and fall upon the lens, will be so bent by the refractive power of the glass as to be made to convene at as many other points behind the lens, and, at the place of their concourse they will form an image or picture of the object. The distance of the image behind the glass varies in proportion to the distance of the object before the glass; the image approaching as the object recedes, and receding as that approaches. For if we suppose, (fig. 2.) A and B, two radiating points, from which the rays A C, A D, and B C, B D, fall upon the lens C D, it is manifest, that the rays from the nearest point A, diverge more than those from the more distant point B, the angle at A being greater than that of B;* consequently the rays from A, whose direction is A E and A F when they pass through the glass, must convene at some point (as G) more distant from the lens than the point H, where the less diverging rays B K and B L from the point B are made to convene; which may also be proved by experiment with the common convex glass.†

---

* Mr. George Adams.

† Dr. Andrew Marshall, of Thavies Inn.

It will be necessary to have this proposition in view, as we shall afterwards have occasion to use it in showing, that by varying the distance between the retina and the anterior part of the eye we are enabled to see objects at different distances.

2d. If an object, as A B, (fig 3.) be placed at a proper distance before the eye (E,) the rays which fall from the several points of the object falling upon the cornea pass through the pupil, and will be brought together by the refractive power of the different parts of the eye on as many corresponding points of the retina, and there paint the image of the object, in the same manner as the images of objects placed before a convex lens are painted upon the spectrum, placed at a proper distance behind it: thus the rays which flow from the point A are united on the retina at C, and those which proceed from B are collected at D, and the rays from all the intermediate points are convened at as many intermediate points of the retina: on this union of the rays at the retina depends distinct vision. But supposing the eye of a given form, should the point of union lie beyond the retina, as must be the case with those from the less distant object, agreeably to the preceding proposition; or should they be united before they arrive at the retina, as from the more distant object, it is evident that the picture at the retina must be extremely confused. Now, as the rays which fall upon the eye from radiating points at different distances have different degrees of divergence, and the divergence of the rays increasing as the distance of the radiating point lessens, and, *vice versa*, lessening as that increases; again, as those rays which have greater degrees of divergence, viz. from the nearer objects, require a stronger refractive power to bring them together at a given distance than what is necessary to make those meet which diverge less, it is manifest, that to see objects distinctly at different distances, either the refractive power of the eye must be increased or diminished, or the distance between the iris and retina be varied, corresponding with the different distances of the objects; both of which probably take place, as will hereafter appear.*

---

* Euclid, Book I. Prop. 21.

† See Kepler, Diopt. Postul. Smith's Optics, Gravesande, &c.

Having then established these as our premises, we shall next examine the different principles which have been employed for explaining vision at different distances.

---

* Facile enim intelligitur, quo longius radii adveniunt, eo magis esse parallelos; eo minus ergo differre ab axi, et eo minoribus viribus corneæ et lentis crystallinæ in focum cogi. Ut enim corpus magis distat, ita sub minori angulo radii adveniunt. Contra si corpus conspicuum valde vicinum fuerit, radiorum ab eo advenientium angulus est major, et adeo magis divergentes in oculum incidunt, et viribus egent refringentibus majoribus omnibus densioribus. *Haller. Elem. Phys.* lib. xvi.

Most writers upon this subject refer this power of the eye to the contraction and dilatation of the iris. Within certain limits this would, upon first examination, as already observed, appear to be the case, since the pupil enlarges as the object is further removed from the eye, and again contracts as it is brought near. The extent of this principle I have already pointed out; but I suspect we also err in attributing to the difference of distance what are only effects of different quantities of light, a circumstance in which it is the more easy to commit error, as they are generally proportionate one to the other: *i. e.* as the object is near we require a less degree of light, and to exclude what is superfluous the iris contracts; but as it is more distant, a greater quantity of light becomes necessary, and the iris dilates: thus far we see the use of the enlargement or diminution of the pupil, as the object is more or less distant. But distinct vision does not consist in the quantity of light alone, though too much or too little would obscure the image.

It is also necessary that the rays which flow from the object should fall upon the retina in a certain direction, to form a distinct picture; but surely the greater or less quantity of light, the greater or less number of rays, which it is only the property of the iris to diminish or increase, cannot alter the direction.

But there is still another argument to prove. that the contraction or enlargement of the pupil is not of itself sufficient to produce distinct vision at different distances, viz. that the myopes, whose pupil contracts and dilates as in other eyes, are still unable to adapt the eye to different distances; and the means by which this is remedied certainly does not consist in a larger or smaller aperture for the rays to pass through, but a power of altering their direction, which the change in the shape of the eye had rendered too convergent. The same fact is also observable in those who squint; the pupil in both eyes equally contracts and dilates, but still the vision of one eye is less perfect than that of the other. Another principle upon which it has been attempted to explain this power of the eye, is a supposed change in the convexity of the crystalline lens: the ancients had some obscure notion of it, but it has been lately pursued by Mr. Thomas Young, in a paper published in the Philosophical Transactions of London, for 1793. He has endeavoured to demonstrate the existence of muscles in the crystalline lens, and by their action to account for distinct vision at different distances. This opinion deserves here the more particular examination, having met the attention of the Royal Society, and thereby likely to influence the general opinion upon this subject.

That we may not mistake the meaning of the author, I beg leave to premise his description of the structure of the lens: "The crystalline lens of the ox," he observes, "is an orbicular convex transparent body, composed of a considerable number of similar coats, of which the exterior closely adhere to the interior; each of these coats consists of six muscles, intermixed with a gelatinous substance, and attached to six membranous tendons. Three of these tendons are anterior, three posterior; their length is about two-thirds of the semidiameter of their coat; their arrangement is that of three equal and equidistant rays meeting in the axis of the crystalline; one of the anterior is directed towards the outer angle of the eye, and one of the posterior towards the inner angle; so that the posterior are placed opposite to the middle of the interstices of the anterior, and planes passing through each of the six, and through the axis, would mark on either surface six regular equidistant rays. The muscular fibres arise from both sides of each tendon, they diverge till they reach the greater circumference of the coat, and having passed it, they again converge till they are attached respectively to the sides of the nearest tendons of the opposite surface. The exterior or posterior portion of the six, viewed together, exhibits the appearance of three penniformi-radiated muscles."

In the first place, to say nothing of the transparency of muscles, as an argument against their existence, we must unavoidably suppose, as they have *membranous tendons*, which Mr. Young informs us he distinctly observed, that these tendons cannot possess the same degree of transparency and density with the bellies of these muscles; that is, they must possess some degree of opacity, or certainly he could not have pointed out their membranous structure, nor even the tendon itself, as distinct from the body of the muscle; and if they have not the same density, from their situation, and being of a penniform shape, must there not be some irregularity from the difference in the refraction of those rays which pass through the bellies of those muscles, and those again which pass through their membranous tendons? This structure then, of consequence, cannot be well adapted for a body whose regular shape and transparency are of so much consequence.

Again, Mr. Young describes six muscles in each layer; but Leeuwenhoek, whose authority he admits as accurate, relative to the muscularity of the lens, is certainly more to be attended to in his observation of bodies less minute, viz. as to the layers themselves, in which these muscles are found; which of course are larger, and more easily observed; but, with his accuracy of observation, he has computed, that there are near two thousand laminæ; and, according to Mr. Young, supposing each layer to contain six muscles, we have necessarily, in all, twelve thousand muscles; the action of which certainly exceeds human comprehension. I hope this will not be deemed trifling minuteness, as it is a necessary and regular consequence, if we admit their existence as described.

But secondly, as to the existence of these muscles, I cannot avoid expressing a doubt. With the utmost accuracy I was capable of, and with the assistance of the best glasses, to my disappointment, I cannot bear witness to the same circumstances related by Mr. Young, but found the lens perfectly transparent: at the same time, lest it might be attributed to the want of habit in looking through glasses, I beg leave to observe, that I have been accustomed to the use of them in the examination of the more minute objects of natural history. After failing with the glasses in the natural viscid state of the lens, I had recourse to another expedient; I exposed different lenses before the fire to a moderate degree of heat, by which they became opaque and dry; in this state it is easy to separate the layers described by Mr. Young; but although not so numerous as noticed by the accurate Leeuwenhoek, still they were too numerous to suppose each to have contained six muscles; for I could have shown distinctly at least fifty layers, without the assistance of a glass, as was readily granted by those to whom I exhibited them.

But a circumstance which would seem to prove that these layers possess no distinct muscles, is, that in this opaque state they are not visible, but consist rather of an almost infinite number of concentric fibres (if the term be at all appropriate) not divided into particular bundles, but similar to as many of the finest hairs of equal thickness, arranged in similar order: see fig. 4, 5, and 6, where the arrangement of the layers and fibres has been painted from the real lens of an ox, and that without the assistance of a glass. To observe this fact, any person may try the experiment at pleasure, and witness the same with the naked eye, even separating many layers and their fibres with the point of a penknife.

This regular structure of layers, and those consisting of concentric fibres, is unquestionably better adapted for the transmission of the rays of light, than the irregular structure of muscles. It may, perhaps, be urged, that the heat to which I exposed the lens may have changed its structure: in answer to that I observe, it was moderate in degree, and regularly applied; of consequence we may presume, as it appeared uniformly opaque, that every part was alike acted upon: but by boiling the lens, where the heat is, without doubt, regularly applied, we observe the same structure.

Thirdly, that it is not from any changes of the lens, and that this is not the most essential organ in viewing objects at different distances, we may also infer from this undeniable fact, that we can, in a great degree, do without it: as after couching or extraction, by which operations all its parts must be destroyed, capsule, ciliary processes, muscles, &c.

Mr. Young asserts, from the authority of Dr. Porterfield, that patients, after the operation of couching, have not the power of accommodating the eye to the different distances of objects; at present, I believe the contrary fact is almost universally asserted.*

Besides, if the other powers of the eye are insufficient to compensate for the loss of this dense medium, the lens, a glass of the same shape, answers the purpose, and which certainly does not act by changing its figure. I grant their vision is not so perfect; but we have other circumstances upon which this can be more easily explained; which will be particularly noticed under the next head. It may not be improper also to observe, that the specific gravity of the crystalline, compared with that of the vitreous humour, and of consequence, its density and power of refraction, is not so great as has been generally believed. Dr. Bryant Robinson, by the hydrostatic balance, found it to be nearly as eleven to ten. I have also examined them with the instrument of Mr. Schmeisser, lately presented to the Royal Society, and found the same result; of consequence, the crystalline lens is not so essentially necessary for vision as has been represented; especially, as it is also probable, that upon removing it, the place which it occupied is again filled by the vitreous humour, whose power of refraction is nearly equal. At the same time we cannot suppose the lens an unnecessary organ in the eye, for nature produces nothing in vain; but that it is not of that indispensable importance, which writers upon optics have taught us to believe.

---

* "Et lente ob cataractam extracta vel deposita oculum tamen ad varias distantias videre, ut in nobili viro video absque ullo experimento quo eam facultatem recuperaverit. Etsi enim tunc ob diminutas vires quæ radios uniunt, æger lene vitrea opus habet, eadem tamen lens in omni distantia sufficit."—*Haller. El. Phys.*

"La lentille cristalline n'est cependant point de première necessité pour la vision. Aujourd'hui, dans l'opération de la cataracte on l'enlève entièrement, et la vision n'en souffre point."—*De la Metherie Vues Physiologiques.* See also *De la Hire, Hamberger's Physiolog.*

Fourthly. Mr. Young tells us, he has not yet had an opportunity of examining the human crystalline; and grants, that from the spherical form of it in the fish, such a change as he attributes to the lens in quadrupeds cannot take place in that class of animals. The lenses which I have examined in the manner above-mentioned were the human, those of the ox, the sheep, the rabbit, and the fish, and in all the same lamellated structure is observable; even in the spherical lens of the fish these lamellæ are equally distinct, but without the smallest appearance of a muscle.

From these circumstances I cannot avoid the conclusion, that they do not exist; at the same time I am persuaded that Mr. Young met with appearances which he supposed were muscles; but I am satisfied he will readily acknowledge, that the examination of the crystalline lens in its viscid glutinous state, is not only attended with much difficulty, but that the smallest change of circumstances might lead to error; which I apprehend may, probably, have been the case in that instance.

Upon examining it after boiling, or exposing it to a gradual degree of heat before the fire, when it may be handled with freedom, he will readily observe (without a glass) the numerous lamellæ, and the arrangement of their fibres, which I have described.

Another opinion has been sanctioned by many respectable writers, of the effects of the ciliary processes in changing the shape and situation of the lens; some supposed them to possess the power of changing the figure of the crystalline, rendering it more or less convex;* others, that they removed it nearer to the cornea;† and others, that they removed it nearer the retina.‡

The advocates for these different opinions all agree in attributing these effects to a supposed muscularity of the ciliary processes.

---

* Des Cartes, Scheinerus, Bidious, Mollinettus, Sanctorius, Jurin.

† Kepler, Zinn, Porterfield.

‡ La Chariere, Perrault, Hartsoeker, Brisseau, and Derham.

Of the structure of these processes Haller observes, "In omni certe animalium genere processus ciliares absque ulla musculosa sunt fabrica, mere vasculosi vasculis serpentinis percursi molli facti membrana;" which structure, I believe, at present is universally admitted. But even supposing them muscular, such is their delicacy of structure, their attachment and direction, that we cannot possibly conceive them adequate to the effects ascribed to them. Besides, what we observed of the muscles of the lens itself, also applies to the processes, viz. that they may be destroyed, as in couching or extraction, and yet the eye be capable of adapting itself to the different distances of objects. For a more full refutation of these opinions, see Haller's large work.

*The Situation, Structure, and Action of the external Muscles.**

Upon carefully removing the eyelids, with their muscles, we are presented with the muscles of the eye itself, which are six in number; four called recti, or straight; and two oblique; so named from their direction, (see plate IId. fig. 1.) A A A A, the tendons of the recti muscles, where they are inserted into the sclerotic coat, at the anterior part

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* For the accuracy of the representation I have annexed (see plate IId.) I can vouch, having been at much pains in the dissection; from which I had the painting taken by a most accurate hand, Mr. S. Edwards, a gentleman well known for his abilities in the plates of that admirable work, the Flora Londinensis.

Plate 2nd to Face Page 23.

Fig. 1.

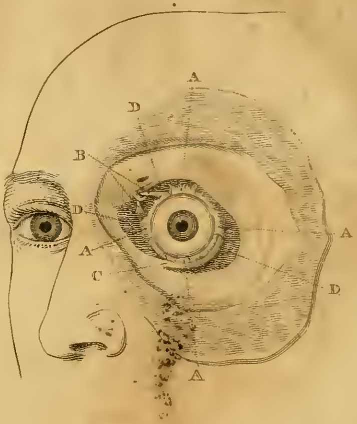


Fig. 2.

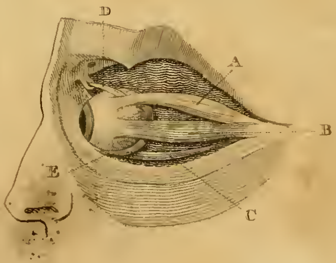
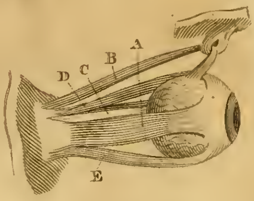


Fig. 3.



of the eye. B, the superior oblique, or trochlearis, as sometimes called, from its passing through the loop or pulley connected to the lower angle of the orbitar notch in the os frontis; it passes under the superior rectus muscle, and backwards to the posterior part of the eye, where it is inserted by a broad flat tendon in the sclerotic coat. C, the inferior oblique, arising tendinous from the edge of the orbitar process of the superior maxillary bone, passes strong and fleshy over the inferior rectus, and backwards under the abductor to the posterior part of the eye, where it is also inserted by a broad flat tendon in the sclerotic coat. D D D, the fat in which the eye is lodged. In fig. 2. we have removed the bones forming the external side of the orbit, with a portion of the fat, by which we have a distinct view of the abductor. A B C, three of the recti muscles, arising from the back part of the orbit, passing strong, broad, and fleshy over the ball of the eye, and inserted by flat, broad tendons into the sclerotic coat, at its anterior part. D, the tendon of the superior oblique muscle. E, the inferior oblique; fig. 3. A, the abductor of the eye. B, the fleshy belly of the superior oblique, arising strong, tendinous, and fleshy from the back part of the orbit. C, the optic nerve. D and E, the recti muscles.

The use ascribed to these different muscles, is that of changing the direction of the eye, to turn it upwards, downwards, laterally, or in any of the intermediate directions, accommodated either to the different situations of objects, or to express the different passions of the mind, for which they are peculiarly adapted. But is it inconsistent with the general laws of nature, or even with the animal economy, that from their combination they should have a different action, and thus an additional use? To illustrate this we need only witness the action of almost any set of muscles in the body: for example, in lifting a weight, the combined action of the muscles of the arm, shoulder, and chest, is different from the individual action of either set, or of any individual muscle; or an instance nearer our purpose may be adduced, viz. the action of the muscles of the chest and belly, making a compression upon the viscera, as in the discharge of urine, fæces, &c. But to question this fact would be to question the influence of the will in any one of the almost infinite variety of motions in the human body.

I presume, therefore, it will be admitted, that we have the same power over these muscles of the eye as of others, and I believe we are no less sensible of their combined action; for example, after viewing an object at the distance of half a mile, if we direct our attention to an object but ten feet distance, every person must be sensible of some exertion; and if our attention be continued but for a short time, a degree of uneasiness and even pain in the ball of the eye is experienced; if, again, we view an object within the focal distance, *i. e.* within six or seven inches, such is the intensity of the pain that the exertion can be continued but a very short time, and we again relieve it by looking at the more distant objects; this, I believe, must be the experience of every person, whose eyes are in the natural and healthy state, and accordingly it has been observed by almost every writer upon optics.

But the power of this combination, even from analogy, appears too obvious to need further illustration. I shall therefore next endeavour to point out their precise action.

Supposing the eye in its horizontal natural position; I see an object distinctly at the distance of six feet, the picture of the object falls exactly upon the retina; I now direct my attention to an object at the distance of six inches, as nearly as possible in the same line; although the rays from the first object still fall upon my eye, while viewing the second, it does not form a distinct picture on the retina, although at the same distance as before, which shows that the eye has undergone some change; for while I was viewing the first object I did not see the second distinctly, although in the same line: and now, *vice versa*, I see the second distinctly, and not the first; the rays from the first, therefore, as they still fall upon the eye, must either meet before or behind the retina; but we have shown that the rays from the more distant object convene sooner than those from the less distant object, therefore the picture of the object at six feet falls before, while the other forms a distinct image upon the retina; but as my eye is still in the same place as at first, the retina has by some means or other been removed to a greater distance from the fore part of the eye to receive the picture of the nearer object, agreeable to the principle, page 12. From which it is evident, that to see the less distant object, either the retina should be removed to a greater distance, or the refracting power of the media should be increased: but I hope we have shown that the lens, which is the greater refracting medium, has no power of changing itself. Let us next inquire, if the external muscles, the only remaining power the eye possesses, are capable of producing these changes. With respect to the anterior part of the eye, we have seen the situation of those muscles; the recti strong, broad, and flat, arising from the back part of the orbit, passing over the ball as over a pully, and inserted by broad flat tendons at the anterior part of the eye; the oblique inserted toward the posterior part, also by broad flat tendons; when they act jointly, the eye being in its horizontal position, it is obvious, as every muscle in action contracts itself, the four recti by their combination must necessarily make a compression upon the different parts of the eye, and thus elongate its axis, while the oblique muscles serve to keep the eye in its proper direction and situation. For my own part, I have no more difficulty in conceiving of this combination of those muscles than I have at present of the different flexors of my fingers in holding my pen. But other corresponding effects are also produced by this action; not only the distance between the anterior and posterior parts of the eye is increased, but of consequence, the convexity of the cornea, from its great elasticity, is also increased, and that in proportion to the degree of pressure, by which the rays of light passing through it are thence necessarily more converged. But another effect, and one not inconsiderable, is, that by this elongation of the eye, the media, viz. the aqueous, crystalline, and vitreous humours through which the rays pass, are also lengthened, of consequence their powers of refraction are proportionably increased; all which correspond with the general principle. It may, however, be said, that as the four recti muscles are larger and stronger than the two oblique, the action of the former would overcome that of the latter, and thus draw back the whole globe of the eye; but does not the fat at the posterior part of the orbit also afford a resistance to the too great action of the recti muscles, especially as it is of a firm consistence, and the eye rests immediately upon it? Admitting then that this is the operation of the external muscles when in a state of contraction, it is also to be observed, we have the same power of relaxing them, in proportion to the greater distance of the object, until we arrive at the utmost extent of indolent vision.

But, as a further testimony of what has been advanced, I had recourse to the following experiment, which will show that the eye is easily compressible, and that the effects produced correspond with the principles I have endeavoured to illustrate.

With the common *speculum oculi* I made a very moderate degree of pressure upon my eye, while directing my attention to an object at the distance of about twenty yards; I saw it distinctly, as also the different intermediate objects; but endeavouring to look beyond it, every thing appeared confused. I then increased the pressure considerably, in consequence of which I was enabled to see objects distinctly at a much nearer than the natural focal distance; for example, I held before my eye, at the distance of about two inches, a printed book; in the natural state of the eye I could neither distinguish the lines nor letters; but upon making pressure with the speculum I was enabled to distinguish both lines and letters of the book with ease.

Such then I conceive to be the action and effects of the external muscles, and which I apprehend will also apply in explaining many other phenomena of vision; some of those it will not be improper at present briefly to notice.

First. May not the the action of those muscles have more or less effect in producing the changes of vision which take place in the different periods of life? At the same time the original conformation of the eye, the diminution of its humours, and, probably, of the quantity of fat upon which the eye is lodged, are also to be taken into the account. But the external muscles becoming irregular and debilitated by old age, in common with every other muscle of the body, are not only incapable of compensating for these losses, but cannot even perform their wonted action, and thus necessarily have considerable influence in impairing vision. Again, does not the habit of long sight so remarkable in sailors and sportsmen, who are much accustomed to view objects at a great distance, and that of short sight, as of watchmakers, seal-cutters, &c. admit of an easy solution upon this principle? as we know of no part of the body so susceptible of an habitual action as the muscular fibre.

Secondly. How are we to account for the weaker action of one eye in the case of squinting? That this is the fact has been well ascertained. Dr. Reid* upon this subject observes, that he has examined above twenty persons who squinted, and found in all of them a defect in the sight of one eye. Porterfield and Jurin have made the same observation.

The distorted position of the eye has, I believe, been generally attributed to the external muscles; but no satisfactory reason has ever been given why the eye, directed towards an object, does not see it distinctly at the same distance as with the other. The state of the iris here cannot explain it, as it contracts and dilates in common with the other; nor can we suppose any muscles the lens might possess could have any effect, as they are not at all connected with the nature of this disease.

But the action of the external muscles, I apprehend, will afford us a satisfactory explanation. When the eye is turned from its natural direction, for example, towards the inner canthus, it is obvious that the *adductor* muscle is shortened, and its antagonist, the *abductor*, lengthened; consequently, as the abductor has not the same power of contracting itself with the adductor, when the eye is directed towards an object, their power of action being different and irregular, the compression made upon the eye and its humours must also be equally irregular, and therefore insufficient to produce the regular changes in the refraction and shape of the eye we have shown to be necessary in adapting it to the different distances of objects. The effects produced by making a partial pressure upon the eye with the finger or *speculum oculi*, before noticed, would also appear to favour this explanation.

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* See his Inquiry into the Human Mind, page 322.

Thirdly. May it not in part be owing to the loss of this combined action of the external muscles, and the difficulty of recovering it, that the operation of couching is sometimes unsuccessful, especially when the cataract has been of long standing? This cannot be attributed to the iris, for it, perhaps, dilates and contracts as before: nor to the muscles of the lens, for they are removed; nor to the state of the nerve, for it is still sensible to light; and yet the patient cannot see objects distinctly; and it is not an uncommon circumstance, even when the operation succeeds, that the sight is slowly and gradually recovered. Instances have occurred, Mr. Bell* observes, of the sight becoming gradually better for several months after the operation.

When we have been long out of the habit of combining our muscles in almost any one action of life, as walking, dancing, or playing upon a musical instrument, we in a great measure lose the combination, and find a difficulty in recovering it, in proportion to the length of time we had been deprived of it; but the individual action of each muscle remains as before. Thus, probably, with the muscles of the eye. A variety of facts of a similar nature must present themselves to every person conversant in the science of optics, which may admit of a similar explanation.

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* See his System of Surgery.

I have thus endeavoured, first, to point out the limited action of the iris, and of consequence the insufficiency of this action for explaining vision. Secondly, to prove that the lens possesses no power of changing its form to the different distances of objects. Thirdly, that to see objects at different distances, corresponding changes of distance should be produced between the retina and the anterior part of the eye, as also in the refracting powers of the media through which the rays of light are to pass. And, fourthly, that the combined action of the external muscles is not only capable of producing these effects, but that from their situation and structure they are also peculiarly adapted to produce them.

Is it not then consistent with every principle in the economy of nature and philosophy, seeing the imperfections of the principles which have hitherto been employed in explaining the phenomena in question, to adopt the one before us, until (agreeably to one of the established rules in philosophising) other phenomena occur, by which it may be rendered either more general, or liable to objections?

I have now finished what was proposed. I have declined entering into an extensive view of the structure of the eye, or any of the general principles of optics, as those subjects have been more ably treated in the works already cited, and thus would certainly have destroyed every claim to attention, which these few pages in their present form may possibly possess; and if I should be so fortunate as to succeed in establishing the principle I have proposed, for explaining the phenomena dependent upon this more important organ of our body (if any part possesses a pre-eminence in nature,) I also hope it may, in abler hands, admit of some practical application, in alleviating the diseases to which its delicate organization so particularly exposes it.*

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* Since the above pages have been written, I have found, upon consulting some of the earliest writers, that the effects of the external muscles did not altogether escape their attention; at the same time they had no distinct idea of their action: I must therefore disclaim the priority of the the thought, although I had never met with it before the circumstances already noticed, of the insufficiency of the iris, had suggested it. If, however, I have succeeded in pointing out the precise action of those muscles, and its application to the general principles of vision, in which, I believe, I have never been anticipated, it will be the height of my wishes.

OBSERVATIONS

ON THE

SURGERY OF THE ANCIENTS.

DELIVERED AS AN

Introductory Discourse

TO A

COURSE OF LECTURES ON SURGERY AND MIDWIFERY,

AT THE OPENING OF THE

COLLEGE OF PHYSICIANS AND SURGEONS,

IN THE CITY OF NEW-YORK.

November, 1807.

No. II.

OBSERVATIONS *on the* SURGERY *of the* ANCIENTS: *Vindicating their claims to many of the reputed Discoveries and Improvements of Modern Times.*

To those in pursuit of knowledge, it is no less interesting to observe the rise and fall of the empire of learning than of states.

In like manner, introductory to a course of lessons upon any art or science, we are naturally led to inquire into the first beginnings or sources whence it arose, and to trace its progress as it advances to perfection.

Introductory to the other parts of the course, I therefore propose, at this time, to call your attention to the most important facts which the history of surgery presents; more especially, as it was practised among the Greeks and Romans: we shall thence learn that the writings of the ancients have not only given origin to most modern improvements, but that very many of them that have been claimed as original inventions, if they have not been copied, are, at least, anticipated in these fruitful sources of instruction.

In the early ages of society, external accidents constituted the greatest evils to which man was exposed. Intemperance, luxury, and the refinements of civilized life, had not then impaired his bodily constitution, nor debauched his mind. He passed his days in the exercise which was necessary to procure the means of his subsistence, and devoted his nights to rest, undisturbed by care, or those anxieties which at present occupy the civilized portion of the human race.

Man, in a state of nature, was therefore subject to, comparatively, but few diseases; though he was probably not less exposed to the common casualties of life than at the present day. In climbing the tree to procure its fruits; in traversing the forest, he was necessarily exposed to ordinary accidents; his attention, therefore, would be first directed to the discovery of such remedies as were calculated to remove the evils thus induced. To restore to its socket the dislocated bone, or to replace it when broken; to heal the wounds inflicted by the beast of the field, or the venomous serpent, must necessarily have been among the first objects of his attention. Accordingly, it is observed by Celsus and other ancient writers, that surgery was cultivated before any other branch of medicine.

The first writers upon physic trace the origin of their art, in common with all other branches of knowledge, to the Egyptians. But the history of surgery, as practised by that people, is so involved in fable, so blended with the pagan mythology, that, notwithstanding the labours of Prosper Alpinus, it is impossible to ascertain their knowledge of medicine, or of any other branch of science. The operations of surgery, stated by the professor of Padua, as having been performed by the Egyptians, namely, the extraction of the stone from the bladder; bleeding in the veins and arteries; the application of the actual cautery, and the paracentesis of the abdomen, in dropsy, must probably have been the operations of the modern and not of the ancient Egyptians.

Let us, therefore, pass over the stories of Hermes and the Egyptian Æsculapius; the fabulous accounts of Osiris, Serapis, Isis, Horus, and Thonis, who were reputed the first practitioners in medicine, and ranked among their divinities, to the more authentic history of the surgery of the Greeks, as related by Homer and Hippocrates.

The first Greek surgeons, on record, are Æsculapius and his sons Machaon and Podalirius. Æsculapius flourished about fifty years before the Trojan war; in that war his two sons distinguished themselves, not only by their valour, but by their skill in curing wounds.

In the Iliad, Machaon is spoken of as one of the most distinguished surgeons at the siege of Troy. He is called the *preserver of the Greeks;* and when wounded by Paris, he is lamented, as deprived of the benefit of that skill which he had so often exercised for the benefit of others.

"The great Machaon, wounded in his tent,
"Now wants that succour which so oft he lent.*

On another occasion, Homer shows the high estimation in which the profession was held:—

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* ———————— Μαχάων
Τὸν μὲν ἐνὶ κλισίησιν ὀΐομαι ἔχοντα,
Χρηΐζοντα καὶ αὐτὸν ἀμύμονος ἰητῆρος,
Κεῖσθαι·

> "A wise physician, skilled our wounds to heal,
> "Is more than armies to the public weal." *

Of Podalirius too, it is said, that on his return from the destruction of Troy, he was driven upon the coast of Caria, and that he cured the daughter of Damæthus of a severe and dangerous illness, by bleeding her in both arms. This is the first authentic record of the operation of blood-letting. It is also stated, as an evidence of the value attached to the profession, at that early day, that the prince, as a reward to Podalirius, for his skill and services, gave him his daughter in marriage, with half of his kingdom as her portion.

Notwithstanding these testimonies of the skill of Machaon and Podalirius, it appears that the practice was very much confined to the removal of the darts or arrows with which their wounds were inflicted, and afterwards to the application of fomentations and styptics to the wounded parts; for, when the heroes, recorded by Homer, were in other respects severely injured, as in the case of Æneas, whose thigh bone was broken by a stone thrown by Diomedes, he makes no mention of any other than supernatural means employed for their relief.

In the writings of Hippocrates, we have a full and circumstantial detail of the state of medicine and surgery among the Greeks in his time. He lived about 400 years before the birth of Christ; and was the first who treated of medicine in a regular

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* Ἰατρὸς γὰρ ἀνὴρ πολλῶν ανταξιος ἄλλων,
Ἰούς τ' ἐκτάμνειν, ἐπί τ' ηπια φαρμακα πάσσειν.

or systematic manner. Prior to his time, even among the Greeks, the practice of medicine was confined to their priests and philosophers. According to Celsus, the healing art became united with the duties of religion, from the consideration, that diseases were inflicted upon mankind as punishments for their crimes; and were only to be averted or removed by the intercession of their priests, and the remedies they prescribed. The connexion which exists between the study of medicine and the works of nature, also led their philosophers to unite the healing art with their favourite pursuits; and it is related of Pythagoras, that he travelled from place to place, not so much to teach the peculiar doctrines of his philosophy, as to practise physic. Thales, Empedocles, Heraclitus, and Democritus, were among the most distinguished of the Grecian philosophers. They were also celebrated as eminent practitioners of medicine and surgery.

Such was the unsettled state of medicine, until the time of Hippocrates. In his hands it assumed the form of a distinct science, and was practised as a separate profession. By his labours it became enriched with his valuable and numerous observations on the symptoms, causes, and cure of diseases; and since his time, has been respected and cultivated, as among the most important of human pursuits.

Hippocrates not only rescued the profession from the hands of ignorance and superstition, but in his works he has left a legacy of great value to the surgeon, as well as to the physician; and although they are the writings of the most ancient author, whose pages are preserved, and written at a period, when the structure of the human body, and the functions of the animal economy, were but imperfectly understood; they are the writings of a master; and like the tablets whence he collected many of his observations, they deserve, even at this day, a place in the temple of science, where all can read and profit from the valuable truths they contain.

Among the surgical works of Hippocrates, are a treatise on *Wounds*, a book on *Ulcers*, another on *Fistulas*, a fourth on *Fractures*, and a fifth on *Dislocations.* His observations on abscess, ulcers, and wounds, show him to have been an accurate clinical observer. His work on the joints and dislocations, contain many practical remarks of great value on those subjects. His aphorisms contain principles which are received as so many axioms in physic and surgery; and, at this day, constitute the subjects of academic exercises in the most distinguished universities.

He performed the operation of blood-letting in different parts of the body; and although he did not understand the circulation of the blood, his observations on the effects of this evacuation, and the diseases in which it is most useful, are judicious and correct. In apoplexy, palsy, inflammatory diseases, iliac passion, quinsy, pleurisy, and inflammation of the abdominal viscera, &c. he made free use of this remedy. In quinsy, and in injuries occasioned by falls, he attached so much importance to bloodletting, that he, in some instances, bled his patient in *both arms*, and frequently *ad deliquum.*

In the treatment of fevers, he was no less cautious in the use of the lancet, than he was bold to employ it in those diseases in which it was decidedly indicated. At the same time that his ignorance of the circulation of the blood occasionally led him into error, the indications of bloodletting, and the circumstances in which it was most advantageously performed, did not escape his notice. The season of the year, the age of the patient, and habit of body, were no less regarded by Hippocrates than they are by physicians and surgeons of the present day. But he was not confined to the use of general bloodletting; he also made use of cupping and scarification for the removal of local diseases.

Hippocrates also performed many other operations, which at this time, notwithstanding the present improved state of anatomy, call for considerable skill and judgment in the operator.

He opened deep-seated abscesses; he performed the operation of tapping in dropsy, and of trepanning in fractures of the skull and injuries of the brain. His aphorism upon the comparative pain and fever, before and after the formation of matter, and which he made the guide of his practice, abundantly shows his accurate knowledge of this subject. His observations on wounds of the head, teach us the great caution with which he formed his prognosis of the event. However small or inconsiderable the injury may appear, he observes, they require attention in their treatment, and care in the practitioner, not to hazard a hasty prognosis of the issue. This observation would do credit to the most enlightened surgeon of modern times; and cannot fail to impress us with an exalted opinion of the talents and experience of Hippocrates.

The *actual cautery* was also one of his favourite remedies, in the treatment of chronic diseases. In a case of ascites, he cauterized the belly eight times, during the forming state of this complaint. The physicians and surgeons of this day have yet to learn many valuable lessons from Hippocrates, and other ancient physicians, relative to the use of this remedy. The successful practice of Pouteau, of Lyons, (see his surgical essays) who has revived the use of this external application ; and the advantages which have resulted from the use of caustics as prescribed by Mr. Pott, in diseases of the spine, tend to establish the importance of the principle upon which the actual cautery was prescribed, and has been found useful.

Many other local applications were made use of in the practice of Hippocrates, that are still employed by the physicians and surgeons of this day.

In an inflammation of the throat, he caused his patients to inhale the steam arising from the infusion of stimulant and aromatic herbs : upon other occasions, he directed fomentations to be applied to the parts affected. The warm bath, fomentations, gargles, ointments, cataplasms, and collyria, were also among the local remedies prescribed by this celebrated physician.

The important operation of lithotomy appears, also, to have been performed in the time of Hippocrates ; for, in the oath administered to his pupils.

he exacts from them the obligation, that they *would not cut for the stone.*

Although the operation, as performed by the surgeons of that day, was apparently simple, compared with the present lateral operation; still, from their imperfect knowledge of the structure of the human frame, it must necessarily have been attended with considerable danger. Even, as improved at this time, it is an operation frequently productive of dangerous consequences; and, in some instances, proves fatal in the hands of the most skilful surgeon. The conduct of Hippocrates, therefore, in prohibiting his pupils from performing so important an operation, at the time the anatomy of the body was imperfectly understood, must give us a high opinion of the correctness of his judgment and his prudence; at the same time, that it attaches an additional value to his works.

Such was the state of surgery in the days of Hippocrates: after a life spent in the duties of his profession, to which he devoted himself, with unwearied industry, he died, in the 101st year of his age; but in his works, he still lives.

In the interval of time, between Hippocrates and Celsus, many surgeons are recorded, by Galen and other historians: but as they appear to have made but few and inconsiderable improvements in the art, we will pass over this period, to the Augustan age; which may also be denominated the Augustan age of medicine, as well as of science. Such it was rendered by Celsus, the Roman Hippocrates.

Celsus was not only distinguished for his professional acquirements, but ranks among the most celebrated writers of antiquity. Whoever, therefore, wishes to become acquainted with the state of medicine and surgery, prior to the fall of the Roman empire, or to read the Latin language, which, in that day, attained its greatest purity and elegance, will peruse his valuable pages; which have gone through almost innumerable editions, and have been translated into almost every language employed as the vehicle of learning. Celsus not only exhibits an historical view of the state of medicine, as practised before his time, but has added much original observation, and many improvements to those of his predecessors. Although he has copied much from the writings of Hippocrates, he was not so blindly attached to his works, as not to discriminate between his merits and his defects. On the contrary, while he gave the opinions and practice of others, he thought for himself. His works are accordingly esteemed the most valuable repository of the medical learning of his time. He treats of the healing art, in all its branches of *diet*, *medicine*, and *surgery*. His seventh and eighth books are exclusively devoted to the latter subject, and contain a systematic view of most of the diseases and operations which fall to the province of the surgeon.

In his observations on *wounds*, *abscesses*, and *ulcers*, he describes the various appearances they assume, and adapts his remedies to the different stages, with as much correctness as is done by the surgeons of this day. To wounds, accompanied with hemorrhage, he applied constant pressure, by means of a sponge, wet with vinegar. If necessary, he applied the ligature to the bleeding vessel, or closed its oritice, by the actual cautery. When attended with inflammation, he enjoined abstinence upon the patient, and covered the part affected with cold applications. In *contusions*, he freely opened the bruised part, or dilated the wound for the evacuation of the blood effused, when there was no danger of injuring the larger blood-vessels, or important nerves. In gangrene, occurring in the extremities, he cut down to the sound parts; and if he failed, by that and other efforts, to conquer the disease, he recommended the amputation of the limb. To promote the suppuration of abscesses, he employed poultices, composed of barley, meal, marsh mallows, or linseed and fenugreek; but when opened, he prescribes stimulant food and drinks, and to the parts he applied honey and other digestives. When the lips of the wound became callous, its surface spongy and insensible, and the discharge of an unhealthy appearance, he washed the wound and the surrounding parts with *wine.* From this practice of Celsus, the surgeons of the present day may learn an important lesson in the treatment of wounds. He also describes the symptoms of that dangerous abscess, the *carbuncle*, and advises the actual cautery to corrode the gangrened part. This practice is now superseded by the internal and external use of the peruvian bark, and other stimulants. In erysipelas, he applied cerussa, with the juice of *solanum*, a powerful sedative. In the treatment of the callous ulcer, he removed the hard edges with the knife, or corrosive applications. In cancers, and in the cancerous ulcer, he prescribed the auripigmentum or arsenic. In fistulous ulcers, if tortuous in their course, with the probe as his guide, he ascertained their direction; divided them freely with the knife; and, upon exposing their internal surface to view, he removed the callous portions, and applied such dressings as were calculated to promote the growth of new parts. In other instances, he effected a cure, by the use of stimulant and corrosive injections. In caries of the bones, he directs them to be perforated as deep as the disease extends, and afterwards a hot iron to be passed into the foramina, made by the perforator, for the purpose of drying and separating the diseased portions: but if the caries and blackness extend through the body of the bone, he advises a a total separation of the part affected.

In his chapter on tumours, he described them according to the nature of their contents, and advises their extirpation. The *steatomatous* tumour, from the firmness of its consistence, he directs to be carefully separated from the skin and surrounding parts, and to be removed entire, without dividing the sac enclosing it. He then directs the lips of the wound to be brought together, and an application made to agglutinate the divided parts; at the same time, making use of wine and other external stimulants, to promote their union. In this treatment, we see the improvements of the present time, of *saving skin*, and *healing by first intention.* That this was the object of Celsus, appears evident, from a subsequent direction which he gives, in case any portion of the sac should be left behind, as in the removal of the melicerous or atheromatous tumour; in which case, he orders the wound to be left open.

and digestives to be applied, for the purpose of throwing off the remaining portion of the sac. In the atheroma of the eye-lids, in which the sac adheres very slightly to the surrounding parts, he directs the teguments to be divided, without wounding the sac, and the tumour to be removed by the fingers, without further dissection; for, he adds, it easily separates. The same mode of treatment you will find recommended in the work of Mr. Hey, as a valuable improvement of the present time. In his chapter, on diseases of the eyes, Celsus treats of the *cataract*, and directs it to be depressed by the needle; and if it rises again, to be broken into pieces; the practice recently adopted by the most eminent surgeons. In *ophthalmia*, he prescribes venesection, purgatives, abstinence, low diet, rest, and a dark room. He washes the eye with collyria, composed of an infusion of roses and the poppy. When attended with defluxion, he employs astringents, cupping, and the actual cautery, to the temple and forehead, analogous in its effects to blisters and issues, as at present prescribed, under similar circumstances.

Celsus also performed the operation of the hare-lip. He extirpated the polypus from the nose; he removed, by excision, the enlarged and indurated tonsils; he diminished the elongated uvula; and he removed the bronchocele, by caustics and the knife. But the skill of Celsus was not confined to the smaller operations of surgery.

In diseases of the bones of the head, and in injuries of the brain, his practice was such as the most eminent surgeons of the present day must approve. The symptoms which are occasioned by a fracture of the skull, are minutely detailed. He is the first who notices the rupture of the vessels of the brain, and the other effects produced by a concussion without fracture of the cranium. He also observes, that the evidence of such injury, is generally a pain immediately above the part affected; and, upon exposing the bone to view, he adds, it is found of a *pale colour.* This characteristic symptom of effusion of blood, or of the formation of matter between the cranium and the membranes of the brain, you will find contained in the works of Mr. Pott; but without the credit due to that accurate observer. In cases of this sort, and in fractures of the skull, it was the practice of Celsus to make a free crucial incision of the integuments; by which, alone, in many instances, the patient was relieved. At the same time, he condemns the precipitate conduct of his predecessors, in proceeding to the use of the trepan, without waiting to observe the effects of other remedies.

The practice of Celsus is, at present, pursued under similar circumstances, by that celebrated surgeon, Mr. Abernethy, of Bartholomew's hospital; who has, in numerous cases, dispensed with the trephine, having relieved his patient by the application of other remedies. But if the symptoms became more formidable, and the patient experienced no benefit from the first operation, Celsus then directed such portions of the bone to be removed, as the extent of the injury appeared to require. In those cases, where the fracture or depression was small, he employed the instrument called the *modiolus*; which, in its construction, is similar to the trephine. But when the fracture was extensive, or of an irregular shape, he made use of a perforator, so as to surround the part affected with holes; and afterwards employed the chisel and mallet to cut out the portion of bone enclosed within them. In this operation, large portions were removed, which the modiolus could not cover, unless frequently applied. Mr. Hey of Leeds, has lately introduced a substitute for the trephine; by which the same advantages are obtained, as by the perforator and chisel of Celsus.

As anatomy, in those days, was very imperfectly understood, we cannot be surprised that Celsus was less successful in some of the more complicated operations of surgery. Accordingly, in reducing strangulated hernia, he experienced great embarrassment: but it is to be recollected, that this operation requires an accurate knowledge of the structure of the parts concerned, to guide the knife of the operator. This knowledge has only been acquired within a few years. In the hands of John and Charles Bell, Mr. Astley Cooper of London, and Mr. Hey of Leeds, this operation has received its best and most important improvements. But in the history given by Celsus, of the symptoms and causes of hernia, and of the nature of its contents, he is no less perspicuous than upon most other subjects that came under his notice. He describes, with great accuracy, most of the species of hernia, now found in books of surgery, except such as occur under Poupart's ligament, and that which takes place between the abdominal muscles. The umbilical hernia he distinguishes into the omental and intestinal, according as the omentum or intestine is contained in the hernial sac. In like manner, he describes the scrotal hernia, as containing omentum, intestine, or both combined, with the symptoms which characterize each species.

He also distinguishes scrotal rupture, as it occurs in the young child, and in the adult. In the former, he directs a compress to be applied to the part, and retained by means of a roller; by which application, he observes, the intestine is oftentimes forced in, and the coats agglutinated; but in the adult, when the intestine is protruded in a large quantity, and attended with symptoms of danger, it appears that he was unacquainted with the mode of replacing it within the abdomen. He observes, it can only be reduced as far as the groin; thereby producing a change, but not a termination of the disease: and in those cases, where he considered an operation necessary, he did not restore the displaced intestine but by means of a ligature or the knife, he diminished the quantity of loose skin, and by the inflammation and thickening of the parts induced, formed a cicatrix, which was calculated to prevent an increase of the prolapsus. Upon the same principle, in umbilical hernia, when the parts protruded were restored to their natural situation, he excited inflammation by ligature and caustics; which so changed the structure of the parts, as to prevent a return of the rupture. Thus far his operation was successful;

but in some instances, from want of anatomical knowledge, he considered it necessary to remove parts which have no connexion with the disease. In hernia of the intestine, he sometimes removed not only a portion of the hernial sac, but also extirpated the testicle itself.

In hernia of the omentum, if small, he replaced it by the hand alone; and to prevent it from being again protruded, he applied a compress to the part, and secured it by a bandage passed round the loins: but if large, he did not attempt to reduce it. He then, to effect a separation of the mortified parts, made use of escharotics or ligatures, preferring them to the scissors or knife, on account of the hermorrhage which attends the use of cutting instruments. The same observation is made, and a similar practice adopted by Mr. Hey of Leeds.

Celsus also performed many other operations in diseases of the abdomen and pelvis, including the organs of generation. In wounds of the intestines, he performed the operation of gastroraphy; and his description of the mode of performing it, corresponds with the directions given by the best writers of the present time. In the treatment of dropsy, he performed the operation of tapping, not only on the side of the belly, but, in some instances, he perforated the navel; which is considered, at this day, as the latest improvement in the manner of performing paracentesis. The hydrocele, circocele, and the inflammation of the testicle, are also well characterized by this accurate observer. He cured hydrocele by incision. The varix of the spermatic cord, as well as the varices of the veins of the legs, he cured by laying bare the vein thus enlarged, and by applying the actual cautery; or removed it by excision, having previously separated the vein, and enclosed it with ligatures, above and below the part to be removed. He divided the prepuce in phimosis; he introduced the catheter in retention of urine, both in males and females. Celsus also performed the important operation of lithotomy; but considered it as attended with great danger. He very judiciously prepared his patient for this, as for every other capital operation, by abstinence from solid food and stimulating drinks. His mode of operating was, in some respects, peculiar to himself; and was hence denominated *lithotomia Celsiana*; but, in most circumstances, it agreed with that afterwards adopted by Paulus Ægineta, and others, by the apparatus minor, or cutting on the gripe. When the operation was finished, he bled his patient, enjoined abstinence, made use of a warm bath, and oily fomentations, to diminish inflammation: but he advised the operation to be performed only in the spring of the year, and confined it to patients between nine and fourteen years of age.

These facts teach us, that Celsus was not sufficiently acquainted with anatomy to perform this operation without great hazard to the patient. At this we cannot be surprised, when we recollect that it is only within a few years that it has been performed with general success. Our only surprise should be, that the art of surgery was so well understood as it appears to have been in his day.

Among other operations, he extracted the dead fœtus from the womb, by means of the crotchet; and when difficulty presented, he divided the child, and removed it piece-meal. To restrain hemorrhage, or to remove any inflammation, induced by the operation, he applied soft cloths, wet with an infusion of vinegar and roses. Condylomata (or tubercles of the anus) and hemorrhoidal tumours, he removed with the knife and ligatures. The same treatment you will find adopted and recommended by Mr. Ware, in his valuable essay on that subject; but which contains no reference to the practice of Celsus. Fistula in ano, he also cured by ligature, making use of a linen thread instead of the leaden wire, employed by the moderns. This mode of treating fistula, was revived by Foubert, and has been frequently practised in France since that time. Professor Camper has also made use of ligatures, in those whom he found fearful of the knife; or when the patient could not submit to the necessary confinement which the incision requires. But the great inconvenience which arises from the long continued irritation of the ligature, and the prolapsus ani, which it sometimes produces, have occasioned it to be laid aside.

Celsus was no less successful in the treatment of fractures and dislocations. His directions for reducing the fracture of the clavicle, and his treatment of fracture of the ribs, correspond with those contained in the present systems of surgery; and in fractures of the extremities, although he did not employ the many-tailed bandage, or place the broken limb in a flexed position, but confined it to the fracture box, he remarks, that the smaller bones were generally united between fourteen and twenty-one days; those of the leg and fore-arm, between twenty and thirty; and those of the arm and thigh-bone, between twenty-seven and forty days. Few surgeons of the present time, I believe, can boast of greater success.

An eminent modern physician, emphatically exhorts every person, in the study of medicine, to keep Celsus in his hands, by night and by day. I trust the outlines I have exhibited of his practice of surgery, and the evidences I have adduced of his skill in that art, will also induce the pupil in *surgery* to give his writings an attentive perusal.

Galen, the physician of the Emperor Marcus Aurelius, also holds a distinguished place in the history of surgery. He was born at Pergamus, a city of Asia, about 130 years after Christ, and during the reign of the Emperor Adrian. He was celebrated, not only as a practitioner in physic and surgery, but as the most accurate anatomist that had then appeared. His knowledge of anatomy, at the same time that it furnished him with more correct views of the functions of the human body, and of the general principles of surgery, also enabled him to perform some operations, unknown to his predecessors. By some who profess to give an account of his works, he is considered as the mere commentator on the writings of Hippocrates; especially upon those subjects which relate to surgery. But although Galen selected every thing he considered valuable in the works of those who had gone before him, he has left the evidence of great original genius, not only as a physician, but as a practitioner of surgery. I may remark, that his writings, like those of Celsus, have been plundered by the moderns, without the least acknowledgment of the source whence they derived the materials of what they afterwards denominated discoverics and improvements.

Without going into a detail of the practice of Galen, I shall confine my remarks to a few of those subjects in which he appears to have added to the stock of knowledge he had received from his predecessors.

In his chapter on ulcers, he distinguishes their several species with so much correctness, that it has evidently been the basis of Mr. Benjamin Bell's treatise upon this subject. Not only the names by which they were designated by Galen, are retained; but even his definition of an ulcer has been adopted by our late systematic. "A solution of continuity, in any of the softer parts of the body," is the definition given of an ulcer by Mr. Bell. "Unitatis solutio est in carnosa parte," is the language of Galen. I may also add, that in the treatment of ulcers, there is scarcely what is called an improvement in the practice of the moderns that was not known to Galen. During the inflammatory stage of phlegmon, he carefully enjoined upon his patient to abstain from wine and stimulants generally. He also made use of the lancet, purgatives, and warm bathing, to diminish the inflammation; but when the ulcer was formed, and a free discharge of matter obtained, he directs his remedies according to the character of the wound. In the simple purulent ulcer, his practice was to bring the edges as nearly as possible into contact. In the sordid ulcer, he made use of honey, verdigris, and terebinthinate applications, to change its condition, and to promote the growth of healthy parts. Oily dressings and relaxing cataplasms, he very properly proscribed as injurious in those cases. With the same view of restoring a healthy action in the part, he directs it to be washed with wine; and, as an evidence that he had in view its stimulant qualities, he observes, that the Falernian, which was a sweet wine, was useless in this respect. "Nam quæcunque dulcia pariter et fulva sunt, ut Falernum, ad id inutilia existunt."

But one of the most approved modes of treating ulcers, in the present day, is by bandage. This, also, was the practice of Galen; and in his direction upon the application of the roller, he observes, it should not be so loose as to give no support to the limb, nor bound so tight as to excite pain by its pressure. "Circumductio etiam ipsa non ita laxa sit ut nihil efficiat nec ita vehemens ut dolorem premendo excitet." In punctures of the nerves, the practice of Galen was also original. If the wound be large, he advises it to be kept open; but if small, he directs it to be dilated, and terebinthinate and other stimulating dressings to be applied, for the purpose of obtaining a free discharge from the surface of the wound. "Ubi aliquis nervus est punctus, cutem ipsam servari oportet, aut quod tutius est latius incidere." In warm climates, the same practice is successfully pursued under similar circumstances, in the present day.

For the purpose of suppressing hemorrhage, when the external application of cold water and astringents failed, such as unripe galls, balaustines, and the stronger austere wines, it was the practice of Galen to raise the bleeding vessel, by means of a hook, and to secure it by a vinculum or ligature. Ambrose Paré, in the sixteenth century, therefore unjustly claimed the use of the ligature as his discovery.

The aneurismal tumour is also well characterized in the writings of this celebrated surgeon. From some expressions contained in his work, I am also induced to believe, that in the treatment of fractures, he placed the broken limb in a flexed position. It was certainly his practice, when the bones were secured by bandage, to place the limb in that situation which occasioned the least pain to his patient; and in the application of the bandage, he was aware of the inconvenience and injury arising from too severe pressure upon the part affected. To aid the generation of bony matter, in forming a callus, he also, as in wounds of the soft parts, made use of wines and other stimulating applications.

Two other writers of respectability, among the ancients, merit our attention, Ætius and Paulus Ægineta. I pass over the works of Oribasius, as they contain nothing important, but what is to be found in the writings of Galen.

Ætius flourished at the end of the fifth and beginning of the sixth century. He was born at Amida, Mesopotamia, and was educated at the celebrated medical school of Alexandria. Although his works are not so well digested or arranged as those of Paulus, his chirurgical writings contain many valuable observations, not to be found in Celsus or Galen, and were even omitted by his successor, Paulus. His account of the diseases of the eyes, is much more minute and complete, than the chapter of Celsus upon the same subject. In the treatment of anasarca, he prescribes scarification of the extremities; not merely for the purpose of a temporary evacuation of the water contained in the cellular membrane, as had been recommended by Hippocrates, but made his incisions so bold and extensive, that he thereby, according to his own observation, not only relieved his patient of anasarca, but frequently cured him of ascites. Sylvius de la Boe, afterwards proposed to perform this species of tapping, by means of a needle, and claimed the discovery as his own.

I have already remarked, that Hippocrates and Celsus made frequent use of caustics, especially in the treatment of dropsy, epilepsy, sciatica, and phthisis. Ætius also employed them, not only in the same complaints, but in many other diseases. In asthma, palsy, empyema, and affections of the head; in obstinate head-aches, or in injuries of the brain, he applied them to the nape of the neck, and to different parts of the head. He directed them to be long continued, to be applied in great numbers, and made of a circular shape, that they might be slow to heal, and thereby afford a large discharge. In the bite of a mad dog, he directed them to be kept open forty or sixty days; and if, in that time, they should, by accident, be closed, he renewed their application. In this free use of caustics, he was followed by Paulus. The issues, as employed at this day, are found useful in the same diseases, for which the caustics were so successfully applied by the ancients. It is said by some, that the use of the *seton* was known to Ætius: this does not appear. Roland, of the tenth century, was the first who described this species of issue. It was afterwards spoken of by Rhazes and Albucasis, as much in use in their day. Dr. Freind remarks, that whoever reads the chapter of Rhazes on this subject, will find that the ancients understood the value of this remedy as well as the moderns.

Ætius also treated of the diseases of women. He notices the causes of difficult labour, and directs the mode of delivery, which should accordingly be pursued. In one respect, his work is imperfect; as he takes no notice of an important branch of surgery, fractures and dislocations.

Paulus Ægineta, so called from his birth-place, the island Ægina, flourished about the middle of the seventh century. He also was a pupil of the Alexandrian school. After finishing his education, he travelled into different countries, and thereby had more extensive opportunities of becoming acquainted with diseases than most of those who had preceded him. His works, accordingly, contain much original matter. His chirurgical writings, in which he devoted a book exclusively to the operations of surgery, have been universally considered as more complete than any that appeared before the revival of learning in the fifteenth century.

It is sufficient evidence of the value of the works of Paulus, that his writings, with those of Celsus, became the text books of Fabricius, a celebrated surgeon of the sixteenth century.

In his treatise on ruptures, the different species of hernia are more minutely detailed, and the operation more circumstantially described than by Celsus. That species of aneurism, arising from a wound or rupture of an artery, which was known to Galen, he describes with great accuracy, as well as the circumstances by which it is distinguished from other tumours. This is not all. In the treatment of the disease, he performed the operation for its removal, in the same manner as is done at this day, by securing the vessel above and below the part affected, and dividing it between the ligatures.

He also describes the fracture of the patella, which was not noticed before his time. In chronic affections of the head, and in diseases of the eyes, he opened the jugular veins; and, in some instances, the arteries behind the ears. To render the operation of cupping more effectual, he improved the scarificator in such manner as to make several incisions at the same time. In cases of quinsy, threatening suffocation, he performed the operation of bronchotomy. He directs it to be performed about the third or fourth ring of the trachea, being a part which he observes is less covered with flesh, and where there is the least danger of dividing many vessels. He is also careful not to make the aperture larger than is sufficient for the purpose of respiration. In this operation, Albucasis afterwards copied Paulus, without an acknowledgment.

Paulus also improved much upon his predecessors, in the manner of performing some of the more usual operations of surgery. In extracting the stone from the bladder, he did not, like Celsus, confine the operation to childhood, but performed it at any period of life. He also directs the incision to be made, not in the middle of the perineum, as was done by Celsus, but upon the left side of it, nearly where the incision for the lateral operation is at this day made. Upon this subject he also gives another important direction; to make the external incision free and large, by which both the sufferings of the patient and the danger of the operation are diminished. Paulus also treats of the diseases of pregnancy, and was skilled in the practice of midwifery.

Such was the state of surgery among the ancients and from the progress they had made, much also was to be expected from the labours of their successors: but a long interval of ignorance and darkness now ensues.

The civilized parts of Asia and Africa were overrun by the Saracens, under Mahomet and his successors. Being, from their religious tenets, the professed enemies to all knowledge not contained in the Koran, they ordered the celebrated library of Alexandria to be destroyed; and with it all the liberal arts had nearly perished.

About the same period, the Goths and Vandals overran the Roman empire. They also were the enemies of science, because they were strangers to it. But after the fury of the Saracens had somewhat subsided, the love of health and life, which is natural to man, induced them to revive the healing art; which had, in a great degree, shared the general fate of learning. The works of Hippocrates and Galen were sought for, and translated first into the Syrian, and thence into the Arabian language: in a few centuries, the Mahomedan governments abounded in schools of physic. Although the works of the most celebrated Greek and Roman writers were transcribed by the Arabian physicians, Rhazes and Avicenna, the science of medicine received little improvement from their hands. In like manner, the knowledge of surgery, among the Arabians, was preserved, but not improved. The precept of Mahomet, which forbad the opening of dead bodies, must necessarily have prevented improvements in anatomy, and consequently retarded their progress in the practice of surgery. Notwithstanding the labours of Rhazes, Avicenna, Albucasis, and other eminent practitioners and teachers of medicine among the eastern nations, surgery received few or no additions, from the time of Paulus until the sixteenth century; when Fabricius, of Aquapendens, published his celebrated system, containing, not only the surgery of the ancients, but many original observations, which may be perused with much interest, even at this day. Of Fabricius, Boerhaave observes, "ille superavit omnes;" "omnibus potius quam hocce carere possumus."

Upon some future occasion, I propose to take a view of the progress of this art, from the revival of learning to the present period; in which I shall enumerate the advantages which the practice of surgery has derived from the discovery of the circulation of the blood, and the subsequent improvements in anatomy and the other branches of the healing art.

SKETCH OF THE ORIGIN AND PROGRESS

OF THE

MEDICAL SCHOOLS

OF

NEW-YORK AND PHILADELPHIA;

EXTRACTED FROM AN

INTRODUCTORY LECTURE

DELIVERED UPON THE

Re-organization of the College of Physicians and Surgeons

IN 1811.

No. III.

SKETCH *of the Origin and Progress of the* MEDICAL SCHOOLS *of* NEW-YORK *and* PHILADELHIA; *being an extract from an Introductory Lecture delivered upon the re-organization of the College of Physicians and Surgeons in* 1811.

INSTRUCTION by lecture has ever been considered one of the best means of imparting knowledge; and if we inquire into the literary history of different nations we shall find, that according as they have been more or less enlightened, institutions for this purpose have been established and supported.

In corroboration of this fact, it may be remarked, that the city of Athens, in its most flourishing period, was proudly pre-eminent in this respect, and justly boasted of her *numerous schools*, as well as of her *philosophers* who presided over them.

Those who are conversant in classical literature need not here be reminded of the "Academy of Plato," the "Lyceum of Aristotle," the "Porch of Zeno," the "Cynosargum of Antisthenes," or of the "School of the Garden," in which Epicurus delineated "the origin and nature of things," and delivered his first lessons of "tranquillity and temperance," to a crowded and delighted audience.

In like manner medical schools have ever been considered among the most efficient means of educating youth designed for the practice of physic. Their institution is almost coeval with the first dawnings of medical science, and their utility has been sanctioned by the experience of all ages.

The medical schools of Cnidos, Rhodes, Cos, and Epidaurus, existed among the Greeks even anterior to the days of Hippocrates, and were founded by the same family, the Asclepiades, from whom he descended: and since his day, such is the connexion that has ever been preserved between philosophy and medicine, that every nation, distinguished for the cultivation of letters, has also been celebrated for its medical institutions.

From the declension of the school of Cos, that of Alexandria became the most distinguished seat of learning, and continued to be so until the middle of the eighth century. But it was no less celebrated for its medical school, at which not only Ætius and Paulus, but most of the Greek physicians, after the time of Celsus, received their education. Even during that dark period, which intervened between the subversion of the Roman empire and the revival of learning, in the commencement of the sixteenth century, several medical institutions were founded by the Arabians, and to which we are, in a great degree, indebted for the preservation of that knowledge which had been derived from the Greeks.

Since that period medical schools have been established in almost every city of the civilized world. I need not here recount to you the numerous institutions of this kind which have been successively established in Spain, Italy, France, Germany, Holland, and in the last century in the principal cities of Great Britain. They are too familiarly known to require such recital. But the utility of medical schools is not confined to the youth who frequent them, nor even to the benefits which the profession may derive from the talents and learning of the pupil: such are the labour and inquiry, so extensive and varied the researches which the office of teaching necessarily imposes upon the instructor, who duly regards the welfare of his pupils and the honour of his profession, that in this respect also, medical schools have led to numberless discoveries and improvements. In this view they have been, perhaps of all others, without exception, the most fruitful source of improvement in the healing art. To this source we are not only indebted for the inestimable writings of those celebrated teachers, Hippocrates and others among the ancients, and for those of Hoffman, Haller, Whytte, Boerhaave, Albinus, Cullen, Fordyce, and the Gregories, among the moderns; but to the discoveries of Harvey, a teacher of anatomy in the University of Cambridge, of Asellius of the school of Paris, Rhuysch of that of Amsterdam, Morgagni of Padua, Walther and Meckel of Berlin, the Hunters, Hewson, and Cruickshanks of London, Black and the Monros of Edinburgh, who were all distinguished teachers in the several schools to which they were attached; our profession owes its most important improvements.

But let us not confine ourselves to the Eastern hemisphere: the light of science has also reached our shore, and, we trust, has kindled a spirit of improvement which will not only reflect, but multiply, the rays which have been borrowed.

In this country Medical Schools are comparatively of recent date. Although the American colonies could boast of several medical characters, distinguished for general literature as well as professional erudition, no attempt was made to establish a regularly organized school for the purpose of medical instruction, until the year 1762. As early, however, as 1750, the body of Hermannus Carroll, executed for murder, was dissected in this city by two of the most eminent physicians of that day, Drs. John Bard and Peter Middleton, and the blood vessels injected for the instruction of the youth then engaged in the study of medicine: this was the first essay made in the United States for the purpose of imparting medical knowledge by the dissection of the human body, of which we have any record. But notwithstanding this first laudable effort of individuals, a regularly constituted medical school was not completed in this city until the year 1769. In the mean time, a few gentleman, who had been distinguished for their literary and professional attainments, undertook an establishment of this kind in the city of Philadelphia. In 1762, Dr. William Shippen, the late eminent professor of anatomy of that city, returned from Europe, where he had finished his medical education, under the direction of that celebrated anatomist and physician, Dr. William Hunter, of London. The pupil fired with the spirit of his master, resolved to extend the benefits of his instruction to the youth of his native city then engaged in medical study. His first class in 1763 consisted of ten pupils, but he lived to see the small beginning extend into an establishment that annually educated between two and three hundred.

In 1765, Dr. Morgan met a few students, in like manner unfolding to them the institutes or theory of medicine, including the materia medica, and the principles of pharmaceutic chemistry. Dr. Adam Kuhn, who had been a pupil of the celebrated Linnæus, upon his return to his native country, was also appointed in 1768 to the joint professorship of botany and materia medica in the college of that city;—and in 1769, Dr. Benjamin Rush, the present distinguished professor of the theory and practice of physic in the University of Pennsylvania, who had just completed his course of medical studies at the University of Edinburgh, first became a teacher of chemistry in the then College of Philadelphia. Long may his useful labours be continued to the advantage of his numerous pupils, the benefit of the profession, and the honour of our country. While those gentlemen were all zealously occupied in the several departments of anatomy, surgery, the theory and practice of physic, materia medica, and chemistry, the venerable Dr. Thomas Bond exhibited to the pupils, at the bedside of the sick, in the Pennsylvania Hospital, a practical illustration of those principles in which they had been instructed, and these were the first Clinical Lectures that had been delivered in this country. The meed of praise is certainly due to the trustees of the College of Philadelphia, and the distinguished president of that body, Dr. Franklin, who at that early day established *the first* regularly organized medical institution in this country.

New-York did not long remain an inactive spectator of the important example set before her by her sister colony. As early as 1768, a similar establishment for medical education, was opened in this city, in which were united the learning and abilities of Drs. Clossey,* Jones,† Middleton,‡ Smith,§ Tennent,|| and the present president of this College.¶

About the same time, in consequence of a public address delivered by Dr. Samuel Bard, at the first medical graduation in 1769, a very important addition was made to the means then afforded of medical education, by the establishment of the New-York Hospital. The necessity and utility of a public infirmary, to use the language of Dr. Middleton, "was so warmly and pathetically set forth in that memorable discourse," that upon the same day on which it was delivered, a subscription was commenced by his excellency Sir Henry Moore, then governor of this province, and the sum of eight hundred pounds sterling collected for that

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* Professor of Anatomy.

† Professor of Surgery.

‡ Professor of Physiology and Pathology.

§ Professor of Chemistry and Materia Medica.

|| Professor of Midwifery.

¶ Dr. Samuel Bard, then Professor of the Theory and Practice of Physic.

establishment. The corporation of the city, animated by the same public spirit and active benevolence, in a short time added three thousand pounds sterling to the first subscription; when the united amount was employed in laying the foundation of that valuable institution, now the pride of our city, and alike devoted to the purposes of humanity, and the promotion of medical science.*

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* In addition to this liberal encouragement, it is proper to add, that through the influence of Dr. John Fothergill and Sir William Duncan, contributions were made by many of the inhabitants of London and other parts of Great Britain. The Legislature of the state also granted an annual allowance of eight hundred pounds, in aid of the institution for twenty years. The plan of a building was agreed to in 1773, but unfortunately when it was almost completed, it accidentally took fire on the 28th of February, 1775, and was nearly consumed. The American war, which now took place, prevented the re-building of the edifice, although the legislature made the liberal grant of four thousand pounds towards repairing the loss. It was not however until the month of January, 1791, that the house was again completed, and in a proper state to receive patients, at which time a number was admitted. In 1801, an agreement was made between the Governors of the New-York Hospital and the Governors of the Lying-in Hospital, by which the existing funds of the latter were to be paid to the use of the former institution, on condition that a lying-in ward should be established, and appropriated in the New-York Hospital for the benefit of pregnant women.

The site of the Hospital is elevated, and for its elegance and extent of view is scarcely exceeded by any other similar institution. The building exhibits a front view 136 feet in length, and about 52 feet in height; the depth of the central part is 48 feet, and that of each wing 86 feet. In the summer of 1808, a great addition was made to the Hospital, by the completion of the Lunatic Asylum, an edifice 90 feet in length, the width of the wings 65 feet, and of the central part 40. It contains about 60 separate cells, all admirably adapted to the purposes for which they were intended. For further particulars, see an *Account of the New-York Hospital.*

Subsequently to this period, the Governors of the New-York Hospital, aided by the munificence of the legislature of New-York, have establish-

The Medical School of New-York, thus provided with professors eminent for their abilities and learning, and an infirmary for the purpose of clinical instruction, promised to be productive of all those advantages which were reasonably contemplated at its first institution; but these fair prospects, in common with those of every other literary institution in our land, were not only interrupted, but totally destroyed by the revolutionary war.

Shortly after the peace of 1783, the Regents of the University attempted to revive the Medical School of this city, and created professors for that purpose. But this attempt, owing to circumstances which need not here be related, proved abortive. Although lectures upon many branches of medicine, were afterwards delivered by several gentlemen in their private capacity, no public measures were adopted for re-organizing the Medical School until the year 1791; when an act was passed by the legislature, for the purpose of enabling the Regents of the University to establish a College of Physicians and Surgeons within this state; but that power, thus vested in them by the state, the Regents did not think it expedient to exercise until 1807. In 1792, the Trustees of Columbia College made another effort, by annexing a medical faculty to that institution. By this connexion, it was supposed by its friends and patrons, that the medical school thus restored, would at least have

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ed the Asylum for the insane at Bloomingdale, in the vicinity of this city, upon a most extensive foundation. See the Reports of the Institution for 1819—1822.

recovered the celebrity it had attained previous to the revolution. How far the liberal views of the trustees of that college, or the expectations of the public have been realized, is too well known to require a single remark on this occasion.*

About the same period of time, the present Medical School of Pennsylvania was revived, and since that event has acquired so much celebrity, that in the number of its pupils, it is probably not even surpassed by the University of Edinburgh. That institution has not only become a source of honour and emolument to its professors, and the means of advancing the literary reputation of the state of Pennsylvania, but has become no inconsiderable source of revenue to the city of Philadelphia. It is calculated that at least 150,000 dollars are annually expended in that city by the students resorting to its medical school from the different parts of the United States. Without dwelling upon the inquiry to what causes the comparative failure of the medical school of Columbia college, and the unexampled success of that of Philadelphia, are to be ascribed, I proceed to observe that the honourable the Regents of the University of New-York, after the most mature deliberation, after devoting the most serious attention to the respective rights and claims of the colleges of this state, as well as to a remonstrance which was presented to them by certain individuals of this city, in the year 1807, did unanimously resolve, immediately to grant a charter for the establishment of the present College of Physicians and Surgeons; as an institution, which, in their opinion, would be calculated to reflect honour upon our city, and in its advantages would be commensurate with the wealth and commercial importance of this great and growing state. The legislature, actuated by the same spirit, and sensible of the benefit to be derived to the community at large, from such an establishment, in the following year, expressed their approbation of the proceedings of the regents, by liberally appropriating 20,000 dollars to its support. During the first three years the success of this school exceeded the most sanguine expectations, and gave abundant evidence that the state of New-York possesses the most ample resources for establishing a system of medical education, equal in all the means of instruction with any institution of this or any other country. Such too were the favourable impressions which had been created upon the minds of the regents, its founders, that upon receiving information of the events which had lately occurred to produce a temporary check to the progress and usefulness of this hitherto promising institution, they immediately, and with the same activity and zeal that led them to the first organization of the college, adopted the most efficient means, not only of removing out of the way every impediment to its prosperity, but at the same time of re-organizing the institution in such manner as they conceived calculated to ensure its permanent success and usefulness.

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* See Observations on the Establishment of the College of Physicians and Surgeons in the city of New-York. By David Hosack, M. D. *New-York*, 1811.

Such, young gentlemen, has been the solicitude manifested by the Regents of the University and the Legislature of the State, in providing for you the means of medical education. But to the liberality of the legislature you are not only indebted for the appropriation which has been already noticed; by the purchase of the Botanic garden, which has recently been placed by the regents under the direction of the professors and trustees of this college, you have also access to an additional source of instruction, which is enjoyed by no other medical seminary in the United States, and one highly necessary to every accomplished and well educated physician. Nor are these the only advantages which are now presented to the student of medicine in the city of New-York; in the College of Physicians and Surgeons he has not only, by means of private dissection and an anatomical museum, the opportunity of obtaining a correct knowledge of the structure of the human frame; he not only enjoys the benefits of an extensive course of chemical experiments, and under the direction of the learned professor of natural history, of becoming acquainted with the various subjects which are embraced in that very interesting and extensive department of human learning, but in the New-York hospital, which encloses within its walls nearly four hundred patients, he has more ample opportunities of observing the diseases which most frequently occur in this climate and country, and which he will have occasion most frequently to meet with in practice, than in any other similar establishment in the United States. Even the Infirmary of Edinburgh, the Hotel Dieu of Paris, or the Hospitals of London, do not afford to their students more real advantages than are to be obtained at this well regulated asylum.

In that excellent institution, the New-York Hospital, as well as in the college in which we are convened, you also have access to an extensive medical library, consisting of the most respectable writings, both of ancient and modern times. I cannot pass by this circumstance without bearing testimony to the liberality of the gentlemen who compose the board of governors of that institution. Entertaining a due sense of the importance of that establishment, as a place of instruction to the student of medicine, they have not only embraced every opportunity, but they have eagerly sought for occasions by which they could render it most profitable to the pupils who attend the practice of the house, as well as a comfortable asylum to the sick, who are the objects of its charity.

Upon the advantages which the liberality and paternal care of the Regents of the University, aided by the munificence of an enlightened Legislature, have thus secured to our profession, I congratulate you with the utmost sincerity. At the same time that we cherish the warmest sentiments of respect for every similar establishment devoted to the interests of learning and humanity, let us now by our exertions demonstrate to the world, that the zeal and public spirit which those respective bodies have manifested for the general interests of learning, have been no less honourable to themselves than beneficial to this community.

Although the city of New-York, by its geographical position in the union, the continued intercourse which it holds with the different states, as well as with most of the commercial cities of Europe, is thereby entitled to many pre-eminent advantages, it must be acknowledged, that it has not hitherto sustained that high literary character that has distinguished the metropolis of Pennsylvania; but we trust the time is at hand when the state of New-York, and this otherwise flourishing city, will be rendered the literary, as it is now the commercial emporium of our country. Shall the state whose commerce renders her first in wealth, whose population amounts to nearly a million of inhabitants, and whose annual revenue to the union has exceeded five millions of dollars, not contribute her quota in wealth, talents, and exertions to the promotion of science? Shall her literature only consist in the means of increasing her number of dollars; shall the Tontine Coffee-House be her only university; and the receipt of customs and insurance companies her colleges? Our patriotism, our pride of character, our love of life, or what is stronger, our love of *gain*, forbids such apathy. No, we will not consent that such negligence shall continue to mark the character of our state, but persevere in our exertions until the city of New-York shall become no less distinguished for its medical school, than it is for its commerce, and its numerous charities. And I see in this auditory, gentlemen* whose talents and literary attainments have enabled them to appreciate the importance of this subject, and whose patriotism and merited influence in our public councils have given us every assurance that our exertions will continue to receive that support which a liberal and enlightened government has it in its power to bestow. Let us then be animated by these prospects, and redouble our exertions. With these impressions I enter upon the duties assigned me in this University.

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* The Hon. Dewitt Clinton, Stephen Van Rensselaer, Mathew Clarkson, and other members of the Board of Regents, were present at the delivery of this discourse.

OBSERVATIONS

ON

THE INDUCTIVE SYSTEM

OF PROSECUTING

MEDICAL INQUIRIES;

AND A

TRIBUTE TO THE MEMORY OF DR. BENJAMIN RUSH:

DELIVERED AS AN

INTRODUCTORY LECTURE

AT THE

COLLEGE OF PHYSICIANS AND SURGEONS,

On the 3d of November, 1813.

No. IV.

OBSERVATIONS *on the* INDUCTIVE SYSTEM *of prosecuting* MEDICAL INQUIRIES, *and a Tribute to the Memory of the late Dr.* BENJAMIN RUSH; *delivered as an Introductory Lecture at the College of Physicians and Surgeons, on the 3d of November,* 1813.

GENTLEMEN,

AMIDST the numerous improvements which have recently taken place in the literary establishments of the city and state of New-York, the institution of a College of Physicians and Surgeons, exclusively devoted to the great purposes of medical education, is certainly an event deserving the highest commendation. It reflects equal honour upon its founders, the Regents of the University, and upon the Legislature, from whom it has received its first endowment and patronage. This institution was first projected, and a law passed, authorizing the Regents of the University to carry it into effect, as early as 1791; but motives of respect to the Trustees of Columbia College, who had annexed a medical school to that seminary of learning, prevented the Regents from carrying the views of the Legislature into operation until 1807, when a charter was first granted for that purpose.

The exercise of the power delegated to the Regents by the act of the Legislature referred to, has afforded just cause of congratulation to the friends of science, as an event, of all others, calculated to advance the usefulness and respectability of the medical profession, the celebrity of the state, and the honour of our country. That the high expectations which were entertained of the benefits that would flow to the community from its establishment were well founded, the history of the College, even during the short period it has been in operation, abundantly testifies: for, during the six sessions that have elapsed, nearly four hundred gentlemen have received the benefits of instruction afforded at this establishment, and of that number about forty have been admitted to the honours of graduation.

But the Regents of the University, as well as the members of the profession in general, have ever been duly sensible of the benefits that would result from an union of the Professors of this College with those constituting the Faculty of Physic of Columbia College. Impressed with the importance of such union, the Regents of the University, in the winter of 1811, respectfully solicited the friendly offices of the board of Trustees of Columbia College in combining the two medical institutions. This event, so desirable in itself, and which promises to be productive of signal and permanent advantages to the profession and the community, has at length been happily accomplished.

Permit me, gentlemen, students of medicine, to offer you my congratulations upon the favourable auspices under which the present session of this College commences: for to you it must prove peculiarly beneficial; as in no other part of the United States can you obtain so extensive a system of medical education as that now afforded by this University. But the establishment of this College, and the ultimate union of the Medical Schools of New-York, constitute an important era in the history of our state; and may I not add, in the history of medical science? For what advantages and improvements may we not reasonably anticipate from the united labours of those who now occupy the several professorships of this College, and of the numerous pupils who may be expected hereafter to resort to this city for instruction?

New-York, in her commercial and agricultural character, has long been distinguished. In these respects, she has justly been considered one of the most important states of the union; but when we take into view the immense provision she has made for common schools; the extensive pecuniary contributions made to her numerous academies; the appropriations granted to her different colleges; the incorporation of new literary societies in different parts of her extensive territory; the acts lately passed for the promotion of medical science; the incorporation of state and county medical societies; the liberal provision made for that invaluable charity and practical school of medicine, the New-York Hospital; and the establishment and endowment of the Institution in which we are now convened, it must be admitted that her pre-eminence is not confined to her population, her commerce.

or her agriculture, but that she is equally distinguished for her protection and cultivation of the arts and sciences, and shortly must combine every advantage that the most favoured states of the union may have individually enjoyed.

My anticipations lead me still further: when peace may be restored, and the benefits of commercial and literary intercourse with the old world be again experienced by this western hemisphere, but a few years can elapse when the Universities of New-York, of Pennsylvania, of Massachusetts, and of Maryland, will hold an honourable competition with the most distinguished seats of learning that now adorn the European continent.

In the profession of medicine it may already be said, that in the United States we possess all the necessary resources for the most finished system of education that can be obtained in any part of the world, not excepting the justly celebrated medical schools of Edinburgh, London, or Paris.

In anatomy, physiology, the principles and practice of surgery, midwifery, the materia medica, chemistry, botany, mineralogy, and other branches of natural history, we have the most abundant means of instruction both practical and theoretical. And in the study of the theory and practice of physic, in acquiring a knowledge of the diseases of our country, we enjoy advantages, which, to the American pupil, are superior to those of any of the schools of the old world: for such is the influence of soil, climate, vicissitudes of season, and the state of society, upon acute diseases, that in this country they exhibit in many respects a character different from those of Great Britain, or of the continent of Europe. Hence it happens, that the American physician, who may have had all the advantages of a foreign course of study, who may have enjoyed all the benefits of instruction which the infirmary of Edinburgh or the hospitals of London or Paris afford, if he has not previously acquired a knowledge of the febrile and other acute diseases of this climate, upon his return to his native country he has still the most important practical lessons to learn, and which experience alone can supply. In this respect, you have advantages at home which you cannot obtain abroad; nay, more, although we have been indebted to Europe for most of the knowledge we possess in the healing art, the European physician has still much to receive in return: he has yet to learn the history of the febrile and other diseases of this country; the varieties they exhibit; the effect of peculiarities of constitution and climate; the causes which produce them, and the various modes of treatment they severally require, before he can attain to those principles which are necessary to constitute a system of practice. For it is justly remarked by an eminent medical writer,* that "no system of medicine can be perfect while there exists a single disease which we do not know, or cannot cure." There cannot, therefore, be a complete system of medicine until our country has furnished the description and the cure for all its peculiar diseases.

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* Dr. Rush.

American genius has already largely contributed to the improvement of the arts, and has done much in developing the principles of civil government. For you and your successors, probably, is also reserved the discovery of those principles in medicine which are necessary to complete the fabric that has been begun by a Sydenham, a Boerhaave, a Hoffman, a Cullen, and other celebrated physicians of Europe. Cherish, then, the feelings which this prospective view excites, and let your exertions correspond with the obligation it imposes.

The Practice of Physic, which, in connexion with Clinical Medicine, it is my province to teach in this University, is very properly defined, by a great systematic writer, to be the art of discerning, distinguishing, preventing, and curing diseases. The discernment of a disease, as Dr. Cullen very properly denominates it, is only to be acquired by long and habitual observation at the bedside of the sick, for it frequently happens, that not only the symptoms, but the causes of disease, are so concealed, that they escape the observation both of the patient and the by-stander; and, even by the physician, are only to be discovered by habitual attention to the phenomena of health, as well as the symptoms of disease. But this discernment admits of still more extensive application, as it presents to the mind those circumstances attendant upon diseases, which no language can define. For although books of practice, and systems of nosology may furnish the description of the symptoms of disease, and faithfully delineate the more prominent features by which they are characterized, there are certain nicer shades of discrimination, which frequent converse with the sick can alone detect: for diseases, like plants and animals, have their peculiarities of character, which no system of nosology will supply, no description, however voluminous or minute, can impart, which no medical Lavater has yet delineated, and with which practice alone can make us acquainted.

It is only the practical botanist who can distinguish plants which have a close resemblance. The eye of the practical physician, in like manner, when quickened by habit, readily distinguishes one form of fever from another, but which are all confounded in the eyes of the hasty observer, or of him whose preconceived notions have interposed a medium that obscures his vision. But this knowledge of the symptoms of disease is not sufficient to lead us to their prevention and cure. Whatever may be the readiness with which diseases may be perceived, or however minute may be our acquaintance with the varied phenomena they exhibit, it is only the knowledge of the various causes by which they are produced, and of the structure of the system upon which they operate, that can direct us to a safe and judicious practice; for, from these sources alone, the great principles upon which the treatment of disease is to be conducted, must be derived.

These causes are of three kinds: such as are generally inherent in our frame, and predispose the system to be acted upon; those which are the most immediate, and for the most part external agents in exciting disease; and lastly, the proximate cause, which denotes the condition of the part affected, or of the whole system, and upon the change or removal of which the corresponding changes or removal of the disease depends. To use the elegant language of Dr. Gregory, that ornament of our profession and of classical literature, "causa proxima est, quæ presens, morbum facit, sublata tollit, mutata mutat."*

The theory of physic, therefore, may be defined to be, that system of principles which is deduced from a knowledge of the human structure, and of the predisposing, exciting, and proximate causes of disease, and by which the practice of medicine is to be directed. By many, however, the term theory has been abused, by considering it as synonymous with every hypothesis that has been promulgated for the purpose of explaining the phenomena of diseases, and with which medicine, like every other branch of philosophy, has in all ages been corrupted. The question then presents itself, by what process are we to attain to those principles so necessary as subservient to practice? I answer, by *accurate observation*, *judicious experiment*, and *cautious induction from the facts which they present.* These are the sources whence was deduced that luminous system of philosophical investigation introduced into physics by Lord Bacon, Robert Boyle, and Sir Isaac Newton. They are the same sources whence those celebrated metaphysicians,

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* Conspectus Medicinæ.

Reid, Gerard, Campbell, and Stewart, have drawn those principles which have recently been applied, with so much success, in explaining the functions of the human mind. And from the same sources, as exemplified in the pages of Hippocrates, Sydenham, and Boerhaave, are to be derived those principles in medicine which can alone conduct us to a judicious and successful practice. Suffer me to arrest your attention in the contemplation of those distinguished benefactors to medical science.

Anterior to the days of Hippocrates, we have no traces of any thing like theory or principles in medicine, much less a regular system of practice. On the contrary, before his time, the only medical knowledge which existed, was the result of random experience, or accidental observation, of the effects of remedies in particular diseases; totally uninfluenced by principles derived from the structure of the human frame, the symptoms of disease, or the causes which produced them. The practice of that day was, consequently, purely empirical, in the strict etymological sense of the term; but it is to be observed, that at that early period of society, the diseases of mankind were few in number when compared with those which intemperance, luxury, and what are called the refinements of civilized life, have since introduced.

Hippocrates was the first physician, of whom we have any record, who attempted to deduce from the facts which were presented to him, certain principles upon which to conduct the cure of diseases. He, therefore, first united the theory with the practice of physic: but it was not that speculative theory which proceeds from hypothesis to facts, but from facts to principles. Hippocrates was in medicine what Lord Bacon was in philosophy: he first pointed out the true road to correct knowledge in our art. Permit me to devote a few moments to this grateful theme, while I endeavour to rescue his venerable name from the imputations which have been cast upon it, even by Lord Verulam himself, and who, it is more than to be suspected, drew from the works of Hippocrates, with which he was intimately acquainted,* that very system of investigation which characterizes the Novum Organum, but which no less distinguishes the writings of our great progenitor.

Hippocrates was born in the island of Cos, about four hundred years before Christ. At that memorable period of Grecian splendour, in which Apelles, Praxiteles, and Demosthenes, adorned the several arts of painting, sculpture, and eloquence, Hippocrates was not less distinguished for his improvement in the healing art, and for which he received not only a crown of gold, but the highest honours Athens could bestow. Having applied himself with indefatigable industry to the various branches of human learning, then most generally taught; having become a proficient in the philosophy of the schools of Cnidus and of Cos, and afterwards added to his stock of knowledge by travel; with a mind thus enriched, and a bodily frame no less vigorous than his mind, (for it sustained him upwards of an hundred years) he entered upon the practice of physic.

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* Bacon on the Advancement of Learning, book II. See his works, vol. 1. p. 122, &c. Lond. Ed. 1803.

Here his talents appear eminently great. The same system of inductive reasoning, which was afterwards adopted by Lord Bacon, was no less the guide of Hippocrates. For it was the maxim of the latter, as of the former, that every principle should be founded upon the firm basis of observation and experience, and that the only correct mode of reasoning is that which proceeds from the effects to the causes that produce them. With this view he not only availed himself of that mass of facts which the temples of Greece supplied,* but he patiently sat down at the bedsides of the sick, recorded every successive symptom of disease, the changes it underwent, as well as the manner of its termination, whether in the dissolution or the recovery of his patient. Although he was unacquainted with the circulation of the blood, or the value of the pulse as the index of disease, he carefully attended to every change in the *respiration* of his patient, which led him to conclusions equally correct; nor was he less attentive to the various secretions of the system, both in the healthy and in the morbid state. Indeed, so minute is the description which he gives of the various appearances the secretion from the lungs undergoes in the different stages of pneumonic inflammation, that to him alone are we yet, at this very day, indebted, not only for the best, but I do not hesitate to say, the only correct and satisfactory description that has been given of that disease. Although totally unacquainted with the nature of the materials constantly emanating from the surface of the body in perspiration, and which is but of recent discovery, he well knew the importance of that function, both in health and disease. But the observations of Hippocrates were not confined to the human body, and to the phenomena it presents in the morbid state: the action of every external agent no less attracted his observant eye. The air, the water, and the earth alike became the subjects of his attention, as far as they were supposed to exert an influence upon our system.* Nor were these the limits of his observation: The movements of the heavenly bodies; their influence upon our planet and upon our frame, were also embraced in his extended view.† From data such as these, and from a long and extensive experience, he founded and built up a system of pure and rational philosophy. As the great object of all his labours was to arrive at truth, and as Bacon discarded the logical definitions and distinctions of Aristotle, so did Hippocrates reject the principal hypothesis of Pythagoras and the other mysterious dogmata of the sophists of his age. Governed by the true spirit of what has lately received the appellation of Newtonian philosophy, he admitted so much only as enabled him to reason more justly in investigating the causes, and in discovering the method of cure in diseases. As the philosophy of Bacon differed from the fashionable logic, or syllogistic form of demonstration, which, until his time, was almost universally received; equally great was the difference between the method of Hippocrates and that of his predecessors.

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* Vide Coacæ prænotio. Lib. Prænotion. I. Prædict. 11.

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* Hippoc. de Morb. Epidem. Lib. 1, 2, 3, &c. et de Aere, Aquis, et Locis.

† Vide Lib. citat. et in aphorism. Sect. 3, 4.

But while we offer the tribute due to this great philosopher and physician, it is not to be denied that his knowledge of the internal structure of the human frame was necessarily limited, and in many respects, erroneous. Although, as has already been intimated, he was ignorant of the circulation of the blood; although he confounded an artery with a vein, and a nerve with a tendon, he effected, even in his own time, more real improvements in the healing art than all his predecessors had done in the space of two thousand years before him; and we may add, more than all his successors did in two thousand years after him. But although he lived in the infancy of medicine, his works, like those standards of perfection, the columns of Grecian architecture, will ever remain the admiration of the world, and the best models for our imitation. "His fame," to employ the language of an able and eloquent writer,* "like a stupendous and solitary mountain, seems to have acquired new height by the wasting effects of time upon the adjacent country."

After the death of Hippocrates, little was done to complete the building of that fabric of which he had laid the foundation. But while the example which he set was imitated, and the road he pointed out was followed, though with unequal steps, there was still a gradual but a sensible augmentation to the stock of medical knowledge. Hippocrates was succeeded by Plato and Aristotle, who concurred, though in different ways, to check the progress of medicine for many centuries. They corrupted almost every branch of human learning. In the room of the Hippocratic method of induction, were now substituted captious disputations and syllogistic quibbles. The mode of reasoning which they adopted, though it afforded some aid in the detection of sophistry, gave little assistance in the investigation and discovery of truth. In short, instead of having recourse to observation and experiments, they multiplied hypothetical propositions, confounded realities with fictions, preferred words to things: in the language of Lord Bolingbroke, "they invented systems more baneful to truth and real learning, than the ravages of the Goths and Vandals."

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* Dr. Rush.

But the circumstance, which of all others, gave currency to the Aristotelian doctrines in medicine, was their adoption by Galen, a man of great learning, little inferior to Aristotle himself in genius, and an ardent admirer of his peculiar talents. He laboured with great zeal to complete and offer to the world a new theory in medical science. His fertile imagination supplied the place of facts, and as he infused into all his writings the subtle distinctions and metaphysical notions of Aristotle, he so far corrupted, more than any other writer in medicine, the true spirit of philosophical investigation. Yet it deserves to be remembered, and to the immortal honour of Hippocrates, that Galen himself was aware, that the practice of Hippocrates was the most just and rational, and that he himself pursued it in the treatment of diseases. What progress the doctrines of Galen made, and how long they were implicitly adopted, are facts too familiarly known to require further mention on this occasion. But happily for mankind, and the interests of science, towards the conclusion of the sixteenth, and beginning of the seventeenth century, another galaxy of talents appeared that dissipated those clouds with which the Aristotelian philosophy had enveloped the world, and which both philosophers and physicians, Ixion-like, had embraced for nearly fourteen hundred years: You will anticipate me in the names of Bacon, Boyle, Galileo, Locke, and Newton. It was not until this period that philosophers and physicians "emancipated themselves from their vassalage to Aristotle and Galen." It was not until this period that the human mind again recovered its freedom and dignity, and genuine science began to develope what had remained involved in the deepest obscurity. To commence this illustrious work was reserved for Lord Bacon, a man in every respect qualified for so great an undertaking. By the publication of his Instauration of the Sciences, he rescued reason and truth from the slavery in which they so long had been held; he effected a total revolution in the empire of science, and laid the foundation of the inductive system of philosophizing, or rather, as we have already attempted to show, he revived the Hippocratic mode of acquiring knowledge.

Nearly contemporary with those distinguished characters, was Thomas Sydenham. As he possessed a strength of understanding, an accuracy of discernment, and an ardour of curiosity no less rare than desirable, he soon perceived the absurdity and pernicious effects of the visionary theories which had preceded. He accordingly devoted the most indefatigable attention to the study of nature, and what he considered of nearly the same importance, the aphorisms and other writings of Hippocrates. He caught the true spirit of philosophy which they inculcate, and was the first in medicine, after the revival of learning, who adopted the inductive method of Bacon, and enforced the plan of study first pursued by the father of medicine. In his preface to his works he states, that we are to arrive at perfection in our science by two means: a faithful relation of the causes and symptoms of diseases, and from thence deducing and establishing their method of cure. Like his great prototype, he accurately noticed the phenomena and progress of diseases, and the manner of their termination, as well as the effects of medicine and diet, in their prevention and cure. He also, more minutely than any other writer, recorded the prevailing epidemics of each year; the influence of seasons, climate, and the sensible qualities of the atmosphere. Want of time, however, forbids that I should here enlarge upon his merits. But while I recommend to you a close and repeated examination of his writings, in order to enable you the better to appreciate them, I shall conclude this imperfect sketch of his character in the words of his celebrated successor: "He was the ornament of England, the Apollo of the art, whom I never consider but my mind presents me with the true picture of an Hippocratic physician, and to whom physic is so much indebted, that all I can say will fall far short of his merit."*

Let us now take a brief notice of another individual, to whom, next to Hippocrates and Sydenham, our profession is most indebted—the illustrious Boerhaave, who was no less eminent in medicine than Sir Isaac Newton in philosophy. Boerhaave flourished about forty years after Sydenham. I shall content myself with giving you some idea of the extent of the knowledge which he possessed, rather than of the manner in which he acquired it. He was well versed in the Latin, Greek, Hebrew, and other of the oriental languages, and also in those of modern Europe. He was a profound mathematician and algebraist, and a remarkable proficient in the philosophy both of mind and matter. He studied the works of Hippocrates, and all the Greek, Roman, and Arabian physicians, as well as those of the most eminent among the moderns. He was the advocate of experimental science, and was himself a distinguished practical anatomist and chemist. In botanical knowledge he was among the first of his age, and in his acquaintance with the various departments of the materia medica, exceeded by none. He thus furnishes the most striking example to show, that it is practicable for a single individual to excel in almost every branch of human learning. Of the numerous writers on medical science whom he studied, he particularly admired Hippocrates among the ancients, and Sydenham among the moderns. Upon his election to the professorship of medicine, in 1701, he pronounced an oration "de commendando studio Hippocratico," in which he not only recommended the writings of the Coan sage as among the most valuable sources of practical information, but particularly enforced the Hippocratic mode of conducting medical inquiries.

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* Boerhaave.

He delivered lectures on the theory and practice of medicine, botany, and chemistry, with the greatest clearness, precision, and eloquence; and had such a conflux of students, from all parts of the world for his hearers, as never, probably, had been presented before any professor. Upon the death of Le Mort, he was placed at the head of every branch of medicine, when the number of his students became so great, that, according to his biographer, Dr. Matty, Leyden itself was scarcely sufficient to accommodate them. In his Institutions of Medicine and his Aphorisms, which have been pronounced two of the most concise, yet comprehensive works which have ever been presented to the medical world, and which have been the text books of the universities of Europe for nearly a century, you will find the result of all that learning, experience, and talents, for which he was so eminently distinguished. But the great talents, the indefatigable application, and the extensive knowledge of Boerhaave held but a second place in his character. In the language of Dr. Johnson, "he was an admirable example of temperance, fortitude, humility, and devotion;" and we may add, christianity enrols his name among her firmest and steadiest supporters.

But, gentlemen, while we thus revere the great and good of the old world, let us do homage to merit in the new. While we acknowledge the benefits which the science of medicine has received from the physicians of Europe, let us not be unmindful of the debt of gratitude we owe to a native of our own soil, who was no less an ornament to human nature, than his various exertions have been precious to his profession, to science, and his country.

Your feelings, I trust, will be in unison with mine, while, in addition to the numerous offerings of public and private respect, which have been paid to the memory of Doctor Benjamin Rush, we devote a few moments to the contemplation of the professional attainments, the public services, the moral and religious character, which make up the portrait of that distinguished philosopher and physician.

Doctor Rush was born on the 24th of December, 1745, on his father's estate, about twelve miles from the city of Philadelphia. His ancestors followed William Penn from England to Pennsylvania, in the year 1683. They chiefly belonged to the society of quakers, and were all, as well as his parents, distinguished for the industry, the virtue, and the piety, characteristic of their sect. His grandfather, James Rush, whose occupation was that of a gunsmith, resided on his estate near Philadelphia, and died in the year 1727. His son John, the father of Dr. Rush, inherited both his trade and his farm, and was equally distinguished for his industry and ingenuity. He died while his son Benjamin was yet young, but left him to the care of an excellent and pious mother, who took an active interest in his education and welfare. In a letter which I had the pleasure to receive from Dr. Rush, a short time before his death, and which was written upon his return from a visit to the tomb of his ancestors, he thus expresses the obligation he felt for the early impressions of piety he had received from his parents:

"I have acquired and received nothing from the world which I prize so highly as the religious principles I inherited from them; and I possess nothing that I value so much as the innocence and purity of their characters."*

But this was not the only source of that virtue and religion for which he was so eminently distinguished. His mother, as if influenced with a presentiment of the future destinies of her son, resolved to give him the advantages of the best education which our country then afforded:—For this purpurpose he was sent, at the early age of eight or nine years, to the West Nottingham Grammar School, and placed under the care of his maternal uncle, the Rev. Dr. Samuel Finley, an excellent scholar and an eminent teacher, and whose talents and learning afterwards elevated him to the Presidency of the College of Princeton. At this school young Rush remained five years, for the purpose of acquiring a knowledge of the Greek and Latin languages, and other branches necessary to qualify him, as preparatory for a collegiate course of study. But under the tuition and guidance of Dr. Finley, he was not only instructed in classical literature; he also acquired what was of no less importance, and which characterized him through life—a habit of study and observation, a reverence for the christian religion, and the habitual performance of the duties it inculcates. For his accomplished and pious instructor not only regarded the temporal, but the spiritual welfare of those committed to his care.

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* The letter here referred to was originally addressed, by Dr. Rush, to the Hon. John Adams, Esq. late President of the United States: from a copy of the same, sent to the author by Dr. Rush, several of the preceding interesting particulars have been taken.

At the age of fourteen, after completing his course of classical studies, he was removed to the College of Princeton, then under the superintendence of President Davies, one of the most eloquent preachers and learned divines our country has produced.

At college, our pupil not only performed his duties with his usual attention and success, but he became distinguished for his talents, his uncommon progress in his studies, and especially for his eloquence in public speaking. For this latter acquirement, he was doubtless indebted to the example set before him by President Davies, whose talents as a pulpit orator were universally acknowledged, and were frequently the theme of his pupil's admiration.

Dr. Rush received the degree of bachelor of arts in the autumn of 1760, at the early age of fifteen. The next succeeding six years of his life were devoted to the study of medicine, under the direction of Dr. John Redman, at that time an eminent practitioner in the city of Philadelphia. Upon commencing the study of medicine, the writings of Hippocrates were among the very first works which attracted his attention; and, as an evidence of the early impression they made upon his mind, and of the attachment he had formed to them, let it be remembered, that Dr. Rush, when a student of medicine, translated the aphorisms of Hippocrates from the Greek into his vernacular tongue, in the seventeenth year of his age. From this early exercise he probably derived that talent of investigation, that spirit of inquiry, and those extensive views of the nature and causes of disease, which give value to his writings, and have added important benefits to the science of medicine. The same mode of acquiring knowledge which was recommended by Mr. Locke, and the very manner of his common-place book was also early adopted by Dr. Rush, and was daily continued to the last of his life. To his records, made in 1762, we are at this day indebted for many important facts illustrative of the yellow fever, which prevailed in, and desolated the city of Philadelphia, in that memorable year. Even in reading, it was the practice of Dr. Rush, and for which he was first indebted to his friend Dr. Franklin, to mark with a pen or pencil, any important fact, or any peculiar expression, remarkable either for its strength or its elegance. Like Gibbon, "he investigated with his pen always in his hand;" believing with an ancient classic, that to study without a pen is to dream—"Studium sine calamo somnium."

Having with great fidelity completed his course of medical studies under Dr. Redman, he embarked for Europe, and passed two years at the University of Edinburgh, attending the lectures of those celebrated professors, Dr. Monro, Dr. Gregory, Dr. Cullen, and Dr. Black.

In the spring of 1768, after defending an inaugural dissertation "de coctione cibarum in ventriculo," he received the degree of doctor of medicine. In that exercise, which was written with classical purity and elegance, it was the object of Dr. Rush to illustrate, by experiment, an opinion that had been expressed by Dr. Cullen, that the aliment, in a few hours after being received into the stomach, undergoes the acetous fermentation. This fact he established by three different experiments, made upon himself; experiments, which a mind less ardent in the pursuit of truth, would readily have declined.

From Edinburgh Dr. Rush proceeded to London, where, in attendance upon the hospitals of that city, the lectures of its celebrated teachers, and the society of the learned, he made many accessions to the stock of knowledge he had already acquired.

In the spring of 1769, after visiting Paris, he returned to his native country, and immediately commenced the practice of physic in the city of

Philadelphia, in which he soon became eminently distinguished.

Few men have entered the profession in any age or country with more numerous qualifications as a physician, than those possessed by Dr. Rush. His gentleness of manner, his sympathy with the distressed, his kindness to the poor, his varied and extensive erudition, his professional acquirements, and his faithful attention to the sick, all united in procuring for him the esteem, the respect, and the confidence of his fellow-citizens, and thereby introducing him to an extensive and lucrative practice.

It is observed, as an evidence of the diligence and fidelity with which Dr. Rush devoted himself to his medical studies, during the six years he had been the pupil of Dr. Redman, that he absented himself from his business but two days in the whole of that period of time. I believe it may also be said, that from the time he commenced the practice of medicine to the termination of his long and valuable life, except when confined by sickness, or occupied by business of a public nature, he never absented himself from the city of Philadelphia, nor omitted the performance of his professional duties a single day. It is also stated, that during the thirty years of his attendance as a physician to the Pennsylvania hospital, such was his punctuality, his love of order, and his sense of duty, that he not only made his daily visit to that institution, but was never absent ten minutes after the appointed hour of prescribing.

In a few months after his establishment in Philadelphia, Dr. Rush was elected a professor in the medical school which had then been recently established by the laudable exertions of Dr. Shippen, Dr. Kuhn, Dr. Morgan, and Dr. Bond. For this station his talents and education peculiarly qualified him. As in the case of Boerhaave, such too had been the attention bestowed by Doctor Rush upon every branch of medicine, that he was equally prepared to fill any department in which his services might be required.

The professorships of anatomy, the theory and practice of physic, clinical medicine, and the materia medica, being already occupied, he was placed in the chair of chemistry, which he filled in such manner as immediately to attract the attention of all who heard him, not only to the branch he taught, but to the learning, the abilities, and eloquence, of the teacher.

In the year 1789 Dr. Rush was elected the successor of Dr. Morgan to the chair of the theory and practice of physic. In 1791, upon an union being effected between the college of Philadelphia and the university of Pennsylvania, he was appointed to the professorship of the institutes of medicine and clinical practice; and in 1805, upon the resignation of the learned and venerable Dr. Kuhn, he was chosen to the united professorships of the theory and practice of physic and of clinical medicine, which he held the remainder of his life. To the success with which these several branches of medicine were taught by Dr. Rush, the popularity of his lectures, the yearly increase of the number of his pupils, the unexampled growth of the medical school of Philadelphia, and the consequent diffusion of medical learning, bear ample testimony; for, with all due respect to the distinguished talents with which the other professorships of that university have hitherto been, and still continue to be filled, it will be admitted, that to the learning, the abilities, and the eloquence of Dr. Rush, it owes much of that celebrity and elevation to which it has attained. What Boerhaave was to the medical school of Leyden, or Dr. Cullen to that of Edinburgh, Dr. Rush was to the university of Pennsylvania.

But Dr. Rush did not confine his attention and pursuits either to the practice of medicine or to the duties of his professorship: his ardent mind did not permit him to be an inactive spectator of those important public events which occurred in the early period of his life.

The American revolution; the independence of his country; the establishment of a new constitution of government for the United States, and the amelioration of the constitution of his own particular state, all successively interested his feelings, and induced him to take an active concern in the scenes that were passing. He held a seat in the celebrated congress of 1776 as a representative of the state of Pennsylvania, and subscribed the ever memorable instrument of American independence. In 1777, he was appointed physician general of the military hospital for the middle department; and in the year 1787 he received the additional gratification and evidence of his country's confidence in his talents, his integrity, and his patriotism, by being chosen a member of the state convention for the adoption of the federal constitution.

These great events being accomplished, Dr. Rush gradually retired from political life, resolved to dedicate the remainder of his days to the practice of his profession, the performance of his collegiate duties, and the publication of those doctrines and principles in medicine which he considered calculated to advance the interests of his favourite science, or to diminish the evils of human life. In a letter which I received from him as early as the year 1794, he expresses this determination, adding, "I have lately become a mere spectator of all public events." And in a conversation on this subject, during the two last years of his life, he expressed to me the high gratification which he enjoyed in his medical studies and pursuits, and his regret that he had not at a much earlier period withdrawn his attention from all other subjects, and bestowed it exclusively upon his profession.

Young gentlemen, let this declaration of that venerable character, who, like Hippocrates of old, well knew the extent of his art, and the comparative shortness of human life, impress your minds with the duties before you; let it teach you, too. the value of time, that it may not be occupied in those pursuits which are unconnected with science or your profession; and, especially, that it be not wasted in idle and unprofitable amusements; for. of the physician it is not enough to say,

> "That here he liv'd, or here expired." POPE.

Such was the attachment of Dr. Rush to his profession, that speaking of his approaching dissolution, he remarks, "when that time shall come, I shall relinquish many attractions to life, and among them a pleasure which to me has no equal in human pursuits; I mean that which I derive from studying, teaching, and practising medicine." But he loved it as a science; principles in medicine were the great objects of all his inquiries. He has well observed, that medicine without principles, is an humble art, and a degrading occupation; but directed by principles, the only sure guide to a safe and successful practice—it imparts the highest elevation to the intellectual and moral character of man.

But the high professional character and attainments of Doctor Rush, did not alone display themselves in his skill as a physician, or his abilities as a teacher; he was equally distinguished as a writer and an author.

The present occasion does not allow me to recite to you even the numerous subjects of his medical publications;* much less does it afford an opportunity to review the opinions they contain. In the ensuing course of lectures these will severally fall under our attention, as the various subjects to which they relate may present themselves. Permit me, however, generally to observe, that the numerous facts and principles which the writings of Dr. Rush contain, the doctrines they inculcate relative to the nature and causes of disease, and the improvements they have introduced into the practice of medicine, recommend them to your attentive perusal and study, while the perspicuity and elegance of the style in which they are written, give them an additional claim to your attention as among the finest models of composition. The same remarks are equally applicable to the epistolary style of Dr. Rush and that of his conversation; in both of which he eminently excelled.

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* For an ample and minute account of the writings of Dr. Rush, the reader is particularly referred to the excellent and instructive discourse delivered before the Medical Society of Charleston, by the Hon. David Ramsay, M. D.

Mr. Fox declared in the British House of Commons, that he had learned more from Mr. Burke's conversation than from all the books he had ever read. It may also be observed of the conversation of Dr. Rush, that such were the riches of his mind; such was the active employment of all its faculties; so constant was his habit of giving expression to his thoughts in an extensive correspondence, in the preparation of his public discourses, and in his daily intercourse with the world, that few persons ever left his society without receiving instruction, and expressing their astonishment at the perpetual stream of eloquence in which his thoughts were communicated.

It has frequently been the subject of surprise. that amidst the numerous avocations of Dr. Rush, as a practitioner and a teacher of medicine, that he found leisure for the composition and the publication of the numerous medical and literary works which have been the production of his pen.

Although Dr. Rush possessed by nature an active and discriminating mind, in which were blended great quickness of perception, and a retentive memory: although he enjoyed the benefits of an excellent preliminary and professional education, it was only by habits of uncommon industry, punctuality in the performance of all his engagements, the strictest temperance and regularity in his mode of life, that enabled him to accomplish so much in his profession, and to contribute so largely to the medical literature of his country. Dr. Rush, like most men who have extended the boundaries of any department of human knowledge; who have contributed to the improvement of any art or science; was in habits of early rising, by which he always secured what Gibbon has well denominated "the sacred portion of the day."

The great moralist* justly observes, that "to temperance every day is bright, and every hour is propitious to diligence." The extreme temperance of Dr. Rush, in like manner, enabled him to keep his mind in continual employment, thereby "setting at defiance the morning mist and the evening damp—the blasts of the east, and the clouds of the south."† He knew not that "lethargy of indolence" that follows the inordinate gratifications of the table. His siesto did not consist in indulgence upon the bed or in the armed chair, to recover those powers which had been paralysed or suspended by an excessive meal, or the intemperate use of vinous or spiritous drinks.

Dr. Johnson, during his tour to the Hebrides, when fatigued by his journey, retired to his chamber and wrote his celebrated Latin ode, addressed to Mrs. Thrale.‡ Dr. Rush, in like manner, after the fatigues of professional duty, refreshed his mind by the perusal of some favourite poet, some work of taste, some volume of travels, biography, or history. These were the pillows on which he sought repose.

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* Dr. Johnson. † Boswell, vol. I. p. 260. ‡ Boswell.

But the virtues of the heart, like the faculties of his mind, were also in continued exercise for the benefit of his fellow-men; while the numerous humane, charitable, and religious associations, which do honour to the city of Philadelphia, bear testimony to the philanthropy and piety which animated the bosom of their departed benefactor, let it also be remembered, that, as with the good Samaritan, the poor were the objects of his peculiar care; and that in the latter, and more prosperous years of his life, one seventh of his income was expended upon the children of affliction and want. Dr. Boerhaave said of the poor, that they were his best patients, because God was their paymaster. Let it also be recorded, that the last act of Dr. Rush was an act of charity, and that the last expression which fell from his lips was an injunction to his son "Be indulgent to the poor."

"Vale egregium academiæ decus! tuum nomen mecum semper durabit; et laudes et honores tui in æternum manebunt."*

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* These words were addressed by Dr. Rush upon his taking leave of the University of Edinburgh, to his particular friend and preceptor, Dr. Cullen. See Inaug. Diss. De Coctione Ciborum. Edin. 1769.

TRIBUTE

TO

THE MEMORY OF THE LATE

CASPAR WISTAR, M. D.

Professor of Anatomy, &c. in the University of Pennsylvania, President of the American
Philosophical Society for the Promotion of Useful Knowledge, &c.

DELIVERED AT THE

REQUEST OF THE STUDENTS OF THE UNIVERSITY

IN THE

Hall of the College of Physicians and Surgeons,

JANUARY 26, 1818.

At a meeting of the Students of the College of Physicians and Surgeons of the University of the State of New-York, held in the College-Hall, Saturday, 24th January, 1818, Mr. OWEN of Tennessee, Chairman, Mr. SHELDON, Secretary:

RESOLVED, That we have received with the deepest regret, the intelligence of the death of that distinguished ornament of our profession, Dr. WISTAR, Professor of Anatomy in the University of Pennsylvania.

RESOLVED, That Professor HOSACK be requested to deliver an eulogy on the occasion, and that Messrs. T. Fortier, J. Smith, and L. C. Beck, be appointed a committee to wait upon him for that purpose.

RESOLVED, That the usual badge of mourning be worn for thirty days.

R. OWEN, Chairman.

E. SHELDON, Secretary.

At a meeting of the Students of the College of Physicians and Surgeons of the University of the State of New-York, held on Monday, January 26th, 1818, Mr. OWEN, Chairman, Mr. SHELDON, Secretary:

RESOLVED, That the thanks of this meeting be presented to Professor HOSACK for the address delivered by him, this day, upon the character and public services of the late Dr. WISTAR, Professor of Anatomy in the University of Pennsylvania, and that he be respectfully solicited to furnish a copy thereof, for publication.

RESOLVED, That the standing committee wait on Professor HOSACK, with a copy of this resolution.

To MESSRS.

T. FORTIER, J. SMITH, AND L. C. BECK,

COMMITTEE.

GENTLEMEN,

I comply with the request which your kindness has dictated; trusting, that the short period of time that has been allotted me for the performance of this duty, will furnish an apology for the errors and defects that will, under existing circumstances, be inseparable from an exercise of this nature.

I am, gentlemen,
with sentiments of regard,
your obedient servant,
DAVID HOSACK.

New-York, January 26, 1818.

No. V.

TRIBUTE, &c.

Gentlemen, Students of Medicine,

Before I enter upon this day's discourse, allow me, in compliance with your request, and in the indulgence of those feelings, which a long and uninterrupted friendship has produced, to call your attention for a few moments to the painful subject that suspended our exercises on the day of our last meeting.* By the death of the celebrated professor, whose loss we lament, not only the city of Philadelphia, the scene of his labours and usefulness, not only the university of Pennsylvania, of which he was a distinguished member, have reason to mourn; but his loss is one of a national character, in which we all participate, and which will be lamented in every part of our land, to which the benefits of medical education have been extended: for there are comparatively few of the physicians of our country, at this time in the practice of their profession, who have not been indebted to him for their instruction in that department of medical education, in which he so eminently excelled.

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* Professor Wistar died in Philadelphia on the 22d of January, 1818; the afflicting intelligence of his decease reached New-York on Saturday the 24th. This discourse was delivered on the morning of the Monday following.

Although we are not permitted to join in the solemn assembly, that will this day be convened to attend his remains to the tomb, let us unite with his numerous friends in the indulgence of those painful feelings which his premature and unexpected death has occasioned, and call to our remembrance some of the most important events of his life, some of the great features of his character, that have given value to his name, and reflected honour upon our country. Such, and so numerous were his virtues, so extensive were his literary and professional attainments, and so distinguished was his career of usefulness, that we are naturally led to trace the progress of that mind, that has been capable of effecting so much for the benefit of his fellow-men.

Dr. Caspar Wistar was a native of that city, which he adorned by his learning, and enriched by his labours: he was born in the year 1760: his parents were of German extraction, and belonged to the society of friends, of which they were highly respected members.

Dr. Wistar received his elementary education at the celebrated grammar school that had been originally established in the city of Philadelphia, by William Penn. At that seminary he received an excellent English and classical education, the institution being at that time under the direction of Mr. John Thompson, an eminent scholar, and very able teacher of the Latin and Greek languages, and now a respectable merchant in the city of Philadelphia. With the preparatory knowledge thus acquired, young Wistar resolved to study medicine as the business of his future life: for this purpose he entered as a private pupil of the late Dr. John Redman, then one of the most eminent practitioners of physic in the city of Philadelphia. While he was thus acquiring the advantages of much practical information in the office of his preceptor, he also diligently availed himself of every opportunity of instruction that his native city then afforded, by attendance upon the medical lectures of Drs. Morgan, Shippen, Rush, and Kuhn.

Stimulated by the success and distinction which those eminent teachers and practitioners of medicine had derived from a visit to Europe, and an attendance upon the celebrated schools of Leyden, Edinburgh, and London; always animated by the desire of excelling in whatever he undertook, and of rendering himself most useful in his profession, he proceeded to Europe for the purpose of improving his acquisitions in medicine, and of extending his researches in those branches of science which are most nearly connected with it, and in which he afterwards excelled.

In the spring of 1784, shortly after his departure for Europe, the trustees of the medical school of Philadelphia, as an evidence of his attainments in his professional studies, conferred upon him the degree of Bachelor of Medicine.

At the University of Edinburgh he was distinguished for the same assiduity, correct moral deportment, and retiring modest demeanour, that characterized him in every period of his life, and which, young gentlemen, permit me to add, you will ever find to be the sure and never-failing passports to distinction and usefulness.

Such, too, was the impression made at that early period of his life, upon his friends in the university of Edinburgh, that his name was ever afterwards mentioned in terms of the warmest regard and respect. The impression which was thus made upon my mind, by the affectionate language in which he was spoken of by the late celebrated divine, Dr. Erskine; by the present eminent physician of that city, Dr. Charles Stuart; and by the elder Professor Duncan, in all of whose families he had been domesticated, can never be erased.

In 1786 he was graduated a doctor of medicine at the university of Edinburgh: upon that occasion he published and defended a Thesis, "*De Animo demisso*," to which subject his attention was probably directed by the feelings that constantly found a residence in his own sensitive bosom.

In February, 1787, after an absence of nearly four years, Dr. Wistar returned to Philadelphia, instructed in every branch of medicine, and the physical sciences with which it is most intimately associated: he was accordingly prepared to fill any station, in which his services might be called for, either as a practitioner, or as a teacher of medicine.

The first testimony borne to his merits by his fellow-citizens upon his return to his native country, was his appointment as a physician to the Philadelphia Dispensary, which had been established in the preceding year.

About that period, the medical school attached to the University of Pennsylvania, and an association denominated the College of Philadelphia, were rival institutions.

The physicians of that metropolis became early acquainted with the professional merit and erudition of their new associate; he was accordingly invited to the professorship of Chemistry and Physiology, in the "College of Philadelphia." This station he accepted, and immediately entered upon the duties assigned him.

As a teacher, he at once evinced those great qualifications, by which he was afterwards distinguished. The same fluency of utterance, the unaffected ease and simplicity of manner, the perspicuity of expression, the animation and earnestness arising from the conviction of the truths he was delivering, as well as the desire of impressing them upon the minds of his pupils, and the readiness with which he summoned and applied the numerous and varied resources of his mind, which many of you, now in my hearing, have had an opportunity of witnessing, Dr. Wistar displayed in a most remarkable manner, in the first lessons he delivered in the then College of Philadelphia.

Although his labours greatly contributed to the reputation of the school with which he was connected, as soon as a favourable moment for conciliation presented itself, with his characteristic amiable and benevolent temper, he evinced the most ardent desire to see the conflict terminated, and the two schools united. Let me add, that chiefly by his instrumentality and disinterested exertions, that very important object was accomplished.

Upon the consolidation of the two rival schools, Dr. Wistar was associated with the late celebrated Dr. William Shippen, as an adjunct professor of anatomy and surgery in the University of Pennsylvania.

I need not say how much his exertions, united with those of his colleagues, have contributed to elevate that medical school to its present high distinction.

The benefits derived from the labours of Doctor Wistar are too well known and appreciated to require notice on this occasion. His transcendant merits as a teacher have left an impression upon those who have had the pleasure of hearing his lectures, that can never be forgotten. Such were his fascinating powers of description, that even upon those subjects that are usually considered as an uninviting part of a course of anatomical lectures, the attention of his hearers was ever awakened and unremitting; even in the demonstration of a muscle or a bone, his views were those of the philosopher, as well as of the anatomist.

But the university of Pennsylvania was not the only scene of his usefulness. Shortly after his return to his native city, he became extensively engaged in the practice of physic and surgery. In the latter branch he was initiated under the immediate friendship and patronage of the late Dr.

John Jones, then the most distinguished surgeon of the city of Philadelphia, as he had been of the American army during the revolutionary war.

Dr. Jones, knowing the modest merit of young Wistar; knowing too that he had been well instructed in the principles of surgery, as well as the other branches of medicine, took an early opportunity of introducing him to the citizens of Philadelphia as an operating surgeon.

Dr. Jones having occasion to perform an important operation, invited Dr. Wistar to accompany him; when the patient was prepared, Dr. Jones, addressing Dr. Wistar, as having better sight than himself, at the same time presenting him his knife, requested it as a favour that he would perform the operation. Dr. Wistar immediately complied; and such was the skill and success with which it was performed, that it at once introduced him to the confidence of his fellow-citizens. The delicate manner in which this unexpected compliment was paid to the talents of Dr. Wistar, was not lost upon his feeling and grateful heart; he ever after acknowledged the patronage of his benefactor by every act of kindness in his power, and by the unceasing expressions of filial affection.

Dr. Wistar was also very early elected one of the surgeons of the Pennsylvania hospital, where he enjoyed the opportunity of illustrating, at the bedside, the principles of practice which he taught from the desk of the university: and permit me here to remark, that his views were not confined to the mechanical or operative part of his profession; but, following the example of a Kirkland, a Pott, a Cruikshank, a Hunter, and an Abernethy, his survey of the disease ever embraced a regard for those general principles, upon which alone that art can be successfully practised.

Dr. Wistar was too much engaged in the practical duties of his profession to enjoy leisure sufficient for extensive literary undertakings. The writings, however, which he has left, are of a nature and character which cause us to regret they are not more numerous. During the prevalence of the yellow fever in Philadelphia, in 1793, and in subsequent years, he was an active partaker in the scenes of calamity that desolated that city; and in the Transactions of the College of Physicians of Philadelphia, you will find several interesting notices by him, on the peculiar character and origin of that fatal epidemic. The System of Anatomy, which he originally designed and published as a text-book for his class, is familiarly known to you all. In every page of that work, whether we view him as an anatomist, or as the enlightened and profound physiologist, the author shows how competent he was for the important office he assumed. He also enriched the Transactions of the American Philosophical Society with several interesting memoirs; and in the volume of this learned association now in the press, and about to appear, he has drawn up with great fidelity, a circumstantial account of the life and labours of his late colleague, Dr. William Shippen.

As a literary character, few men held a more elevated rank, in the estimation of all to whom he was known, than Dr. Wistar. Beside those branches of science more immediately connected with the medical profession, as far as his duties as a practitioner permitted, he cultivated, with great industry and success, almost every department of literature. His house was the weekly resort of the literati of the city of Philadelphia, and at his hospitable board the learned stranger from every part of the world, of every tongue and nation, received a cordial welcome. His urbanity, his pleasing and instructive conversation, his peculiar talent in discerning and displaying the characteristic merits or acquirements of those with whom he conversed, will be remembered with pleasure by all who have ever enjoyed his society and conversation.

In 1815 he was elected an honorary member of the Literary and Philosophical Society of New-York; and, as an evidence of the high estimation in which he was held, both for his learning and his private worth, I may add, that when the presidency of the American Philosophical Society for Promoting Useful Knowledge, was vacated in 1816, Dr. Wistar, by an unanimous suffrage, was elected to fill that honourable station: honourable, having been previously occupied only by his illustrious predecessors, a Franklin, a Rittenhouse, and a Jefferson.

AN ADDRESS,

DELIVERED

ON THE TWENTY-SIXTH OF MAY, 1818,

AT THE

INTERMENT OF DR. JAMES TILLARY,

LATE PRESIDENT OF THE ST. ANDREW'S SOCIETY OF
THE CITY OF NEW-YORK.

Delivered at the request of the Society.

No. VI.

ADDRESS.

Friends and Fellow Members of the
St. Andrew's Society,

Upon this melancholy event, some expression of those feelings which pervade every heart in this assembly, is due to the memory of our distinguished associate, whose remains now lie before you. In the absence of his much-loved reverend friend and pastor of this church,* by whom this duty would have been performed in a manner more suited to the solemnity of this occasion, and more in consonance with your feelings, I am induced to appear before you, only by my sincere regard for the memory of our late excellent colleague, and to testify to you my desire to comply with your wishes in expressing that respect which we all entertain for our deceased president and fellow-citizen. There is a consolation, melancholy indeed, but not the less grateful on that account, in paying the humble tribute of esteem and affection to the memory of one who exhibited so many qualities worthy of our imitation.

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* The Rev. Dr. Mason.

I knew him, and received much of his friendship at an early period of my life; and when on a visit to the land of his birth-place, had the satisfaction of hearing from his contemporaries, who distinctly recollected him at school, that he was even then regarded as a youth of promise: and at that early period of his life, was characterized by that integrity and virtue which marked the remainder of his days.

Having laid the usual foundation of classical learning, in which his attainments were very respectable, and having received some preliminary medical knowledge in the north of Scotland, he enjoyed the benefit of a course of instruction at the great medical school of Edinburgh. Although he did not remain at the university the time prescribed to obtain its honours, he assiduously attended the various lectures, which qualified him for the station he soon afterwards obtained, that of a surgeon in the army of Great Britain. In that capacity, at an early period of the revolutionary war, he first came to this country, which he made the permanent place of his residence.

Shortly after his arrival in this city, he assumed the character of a practitioner of medicine and surgery. To the former branch, however, he principally confined his attention, and for more than forty years exercised its responsible and important duties—with what success the inhabitants of this city can abundantly testify; you all can testify, for you have had daily evidence of his professional merit and skill. It is not my intention to detain you by a recital of the various qualifications which adorned his professional character—those will, doubtless, be delineated by another society, of which he was a conspicuous member, and where he also for many years occupied the most elevated station in their power to bestow.* But I must nevertheless, be permitted to bear my testimony to his merit as a practitioner of the healing art. He seemed by nature to be peculiarly capacitated for the exercise of the medical profession; and the education which he had received was sufficient to elicit the native energies of his mind for that purpose. He was a substantial classical scholar; his reading of medical authors was limited, but judicious: among these, Sydenham and Huxham were his favourites. He was a patient and close observer at the bed-side of the sick—he reflected—and his decisions evinced the solidity of his understanding. Few men, I think, surpassed him in strength of judgment; and this qualification of the head gave him that elevated station among many of his fellow-practitioners, which he so long and deservedly enjoyed. He was sceptical of novelty in medical prescriptions, and slow in adopting new methods of cure. He carefully observed the progress of disease—he discovered its nature, and was bold and energetic in his principles of treatment. He was confident of his own practical knowledge, and inspired a corresponding confidence in those for whom he prescribed—few men performed their duty to their patients with more fidelity. He spared no pains in collecting all the symptoms from which the disease might be ascertained, and the corresponding remedies directed for its removal.

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* Dr. Tillary was for several years the President of the Medical Society of the county of New-York.

During those memorable visitations with which our city was afflicted in 1795 and 1798, when pestilence spread its devastation upon our shores, though fully conscious of our impending danger, he abided with us; and no consideration whatever could induce him to swerve from his duty—a faithful sentinel, he remained at his post. Amidst the distressing and fatal ravages of yellow fever, Dr. Tillary spared no exertions that could contribute to the comfort of his suffering fellow-citizens. He visited and attended with unceasing assiduity all who called for his professional services, without reserve; and it may be added, that to the poor and forsaken, from whom no recompense could be expected, his labours were for the most part devoted; the more wealthy, who were able to remunerate him, having chiefly abandoned the city, then the scene of desolation.

I frequently conferred with him during those anxious and melancholy seasons. I remember well his perseverance and his fortitude; nor were they forgotten by his fellow-citizens. For the important services he thus performed to the community, he was afterwards rewarded by the honourable office of resident physician; the duties of which, though full of hazard and responsibility, were performed with that fidelity which correct principles of conduct must ever secure.

In relation to medical decorum, he was a pattern of excellence to his professional brethren:

with reference to the rights and feelings of the junior members in particular, his conduct was peculiarly delicate and honourable.

As a citizen of this republic, I may venture to say, that while he remembered with becoming feelings the land of his forefathers, he possessed an ardent attachment to his adopted country. He admired the genius and nature of our social, political, and religious institutions. He was not an indifferent spectator of passing events; and in that species of knowledge which is acquired by intercourse with the world, he was excelled by few.

Fellow Members of the St. Andrew's Society,

Your bereavement is of no common kind. You have lost him to whom you have looked up as your principal. After the resignation of a gentleman,* who many years filled and reflected honour upon the office of president of the society, our lamented associate united your hearts and suffrages as the next most worthy of your confidence, and in that responsible office, now vacant by death, he discharged its duties with distinguished ability and universal satisfaction. As the physician of your charitable and praise-worthy institution, an office which he filled for many years, the disinterested generosity which he manifested in his medical attention to the indigent poor, who are the objects of its charity, is familiarly known to you all.

It may be asked, had the deceased no failings?

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* Robert Lenox, Esq.

He had his failings, but they were of that minor character, that are inseparable from our nature:—He was human, and he erred.

Let those who delight to dwell upon the shade of human character, search out the frailties of our deceased brother; for ourselves, we can shed the tear for his weaknesses, and abundantly rejoice at his numerous excellences.

Indulge me, if, before I close, I speak of his christian virtues; they are a proper topic for a christian audience—they made up a large portion of his character, and they ought not to be omitted. On this momentous subject, he has not left the world to doubt of his religious creed. He has long, both in public and private, evinced his faith and his hope; and has declared his firm belief in the great truths of the christian religion; a belief arising not merely from those impressions which an early pious education leaves upon the mind, but from a careful examination of the evidences upon which it has been embraced by most of the distinguished men who have adorned the world. His course of reading on religious subjects was extensive: the volume of nature, too, he consulted with additional strength to those opinions which he had derived from revelation, and he adds another happy example to the many already on record, of the possession of sound christian principles by a member of a profession in which it is too generally and most erroneously supposed, religious scepticism abounds. To the christian philanthropist, moreover, it is consoling to reflect, that at a time when, to use the language of an eloquent American divine,* "scepticism is breathing forth its pestilential vapour, and polluting, by its unhallowed touch, things divine and sacred, so many of the great and the wise, as if touched with an impulse from heaven, appear as the advocates of christianity," and present, with one accord, their learning, their talents, and their virtues, as an offering on the altar of religion.

Religious consolation, while it supported him in life, shed a ray of glory around the dying bed of our deceased brother, and in his latter moments, to the exclusion of every other concern, claimed all his thoughts.

In the records of those eminent men who have supported the medical character of our country, Dr. Tillary will maintain a highly respectable rank; and while talents, inflexible integrity, and distinguished virtue, are held in remembrance, his memory will be cherished by his fellow-men, especially by that society of his native and adopted countrymen, with whom he was so long and so intimately connected.

I lament to add that the circumstances† under which I now address you, have not permitted a more ample expression of that esteem and respect which we all cherish for our departed friend.

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[*] The Rev. Dr. Nott.

[†] This address was delivered at the request of the St. Andrew's Society, on the day subsequent to the death of Dr. Tillary.

A
BIOGRAPHICAL MEMOIR
OF
HUGH WILLIAMSON, M. D. LL. D.

Member of the New-York Historical Society; Corresponding Secretary of the Literary and Philosophical Society of New-York; Member of the American Philosophical Society; of the Holland Society of Sciences; of the Society of Arts and Sciences of Utrecht, &c. &c.

DELIVERED ON THE FIRST OF NOVEMBER, 1819.

AT THE REQUEST OF THE

New-York Historical Society.

NEW-YORK HISTORICAL SOCIETY,

July 13th, 1819.

Resolved, That a Biographical Discourse, commemorative of the political character and literary services of Dr. Hugh Williamson, late a member of this Society, deceased, be delivered before the Society, and that Dr. David Hosack be requested to perform the duty.

JOHN PINTARD, *Recording Secretary.*

NEW-YORK HISTORICAL SOCIETY,

November 9th, 1819.

Resolved, That the thanks of this Society be presented to Dr. David Hosack, for his Biographical Memoir of our late respected member, Hugh Williamson, LL. D., delivered before the Society on the first instant, and that he be respectfully requested to furnish a copy for publication.

Resolved, That *Colonel John Trumbull*, *Gulian C. Verplanck*, *Esq.*, and the *Rev. F. C. Schaeffer*, be a committee to wait on Dr. Hosack with the preceding resolution.

JOHN PINTARD, *Recording Secretary.*

NOTICE.

It is proper for me in this place to acknowledge, that in preparing the following Discourse, in addition to those resources which an uninterrupted friendship of twenty-five years with the subject of this memoir, has furnished me, I have received many of the anecdotes and other circumstances relative to the earlier years and education of Dr. Williamson from his family and friends.

To his brother, Captain John Williamson of Charleston, South Carolina—to his nephew, Mr. John Nevin, of Shippensburgh, Pennsylvania—to the late President of the United States, Thomas Jefferson—to the Right Reverend Bishop White—to James Read, Esq. of Philadelphia,—and to Mrs. Hall, daughter of the late Dr. Ewing, Provost of the University of Pennsylvania, I am particularly indebted.

For several facts relative to the means of classical education afforded by the middle colonies anterior to the American revolution, I also acknowledge my obligations to "the Memoirs of the Life of the late Dr. Rittenhouse, by William Barton, Esq.;" and to that learned and excellent history of literature and science in this country, entitled, "A Brief Retrospect of the eighteenth century, by the Rev. Samuel Miller, D. D. now Professor of Ecclesiastical History and Church Government in the Theological Seminary at Princeton, in New-Jersey."

D. H.

New-York, January 1, 1820.

No. VII.

BIOGRAPHICAL MEMOIR.

Gentlemen,

Members of the Historical Society,

We are assembled at this time to contemplate the character of our late distinguished member, Dr. Hugh Williamson, and to recount the services rendered to his country and to literature by that eminent philosopher and statesman. Upon no occasion could the resolution you have adopted, to commemorate the virtues and the wisdom of the more eminent and useful members of our institution, have been more appropriate, than on that which you have selected; for if a life, devoted to patriotism—to professional services—to the cause of science—and to the constant performance of moral and religious duty,—deserve our notice, and be worthy of a public record, then it is meet that the name of Hugh Williamson be placed upon the column you propose to erect to the memory of the great and the good.

To you, young Gentlemen of the College of Physicians and Surgeons,* who are at this time convened for the prosecution of your medical studies, the subject of the discourse, now to be delivered, is full of interest and instruction. I have, accordingly, with the permission of the society, at whose request this exercise has been prepared, made choice of this day for the performance of the duty assigned me, that I may have an opportunity of exhibiting to you the portrait of virtue, science, and religion, blended, as they ever ought to be, in the character of an accomplished physician.

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* This discourse was delivered to the Historical Society, in the Hall of the College of Physicians and Surgeons, at the opening of the winter session, upon which occasion the students of medicine were also assembled.

Dr. Williamson was a native of the state of Pennsylvania: he was born on the 5th day of December, 1735, in West Nottingham township, near Octarara river, which divides Chester from Lancaster county. His parents were natives of Ireland, but their earlier ancestors, it is believed. came originally from Scotland.

His father, John Williamson, was an industrious tradesman, who had pursued his business, that of a clothier, in the city of Dublin. He came to America, and settled in Chester county, about the year 1730.

The mother of Dr. Williamson, Mary Davison, was a native of Derry: with her father, George Davison, she came to this country, when a child about three years of age: on their way to America they were captured and plundered on the coast. by Theach, the noted pirate Blackbeard; upon being released they arrived in Philadelphia. She died about fifteen years since, having attained her 90th year. The parents of Dr. Williamson were married in the year 1731, shortly after his father's arrival in this country; and ten children, viz. six sons and four daughters, were the fruits of that connexion. Hugh was their eldest son.

His parents were both distinguished for their undeviating integrity—their habits of industry and frugality—their great moral worth, and attention to the duties of religion.

Of this parentage, Dr. Williamson was justly proud, believing with the Roman poet,

> " ———nec census, nec clarum nomen avorum,
> Sed probitas maguos, ingeniumque facit."
> *Ovid. Epist.—Pont.* I. 9. v. 39.

His father, observing that Hugh was of a slender, delicate constitution, and that he was not likely to attain to that vigour that would enable him to support himself by manual labour, resolved to give him a liberal education. After having received the common preparatory instruction of a country school, near his father's house, he was sent at an early age to learn the languages at an academy established at New-London Cross Roads, under the direction of that very eminent Scholar, the Rev. Francis Alison, justly entitled, from his talents, learning, and discipline, the *Busby* of the western hemisphere.

At that period, I may remark, the means of instruction in the middle colonies were confined to grammar schools or academies; for the University of Cambridge, Massachusetts,* the college of William and Mary, in Virginia,† and of Yale College, in Connecticut,‡ were the only regularly organized establishments at that time in this country; for neither in New-Jersey,* Pennsylvania,† New-York‡ nor Maryland, had any public measures been taken for the promotion of literature: what was done was exclusively the result of individual exertion.

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* Established in 1638. † In 1690. ‡ In 1701.

But although the colonies just mentioned did not enjoy the benefits of regularly organized *collegiate* institutions, yet they possessed in their academies and grammar schools, the most ample means of instruction in classical literature, and in most of the sciences constituting the usual education preparatory to the study of the learned professions.

The academies established on the Neshaminy, in the neighbourhood of Philadelphia, by the Rev. Mr. William Tennent and Mr. Roan; the grammar school commenced by Mr. Grew, Mr. Annan, and Mr. Stevenson, in the city of Philadelphia; the still more celebrated institution of the Rev. Dr. Alison, at New-London Cross Roads, Chester County; that of Frog's Manor, established by the Rev. Samuel Blair; and that of West Nottingham, by the Rev. Dr. Samuel Finley, who was afterwards made President of the College of New-Jersey, have been the means of educating some of the most distinguished men that have adorned our country; and in connexion with the elder collegiate institutions, of diffusing through our land a taste for letters, that is still assiduously cultivated, and the impulse of which must long be continued.

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* College of New-Jersey, was established in 1746.

† College of Philadelphia, in 1753.

‡ King's, now Columbia, College, in 1754.

The names of the venerable Charles Thompson, the late Secretary of the American Congress; the Rev. Dr. John Ewing, late Provost of the University of Pennsylvania; Thomas M'Kean, the late Governor of that State; Dr. Benjamin Rush, one of the most distinguished physicians of his day: the Rev. Dr. John Rodgers: the Rev. Dr. Alexander M'Whorter; and the Tennents, Gilbert, John, and William, among the most able and learned divines of our country; with many other eminently useful men, who received their elementary education at the seminaries I have enumerated, compose a constellation which will ever reflect lustre upon the American character, and honour upon the teachers from whom they received their first lessons in literature; and, I may add, in virtue: for it was no less an object of their instructers, "to mend the heart," than to improve the understanding.

Mr. Williamson enjoyed the advantages of being educated in one of the most celebrated of these institutions, then under the care of Dr. Alison, which academy, upon the removal of that gentleman to the station of Vice Provost and Professor of Moral Philosophy, in the College of Philadelphia, was afterwards transferred to Newark, in the State of Delaware, under the direction of his pupil, the Rev. Alexander M'Dowell.

In the School of Dr. Alison, and of his successor Mr. M'Dowell, Mr. Williamson remained until he had made great proficiency in all those branches of learning that were considered necessary for his admission into college.

In the prosecution of his studies, while at school, he distinguished himself by his diligence, his love of order, and his correct, moral, and religious deportment; for, even at that early age, he had imbibed from his parents and instructers, a due sense of that "intimate connexion which subsists between letters and morality, between sensibility and taste, between an improved mind and a virtuous heart."* Accordingly, under the impulse of these first impressions, through life, he

> "——————— all his study bent
> To worship God aright, and know his works."

Thus prepared under the care of his eminent teachers, he retired from the seminary of Dr. Alison, and, at his father's house, applied himself to the study of Euclid's Elements, of which, in a short time, he became master. I may here observe, that he discovered very early in life, a strong attachment to mathematical reasoning, and to that order and precision, which the science of mathematics impresses upon the mind: but his absolute want of a poetical talent was not less perceptible.

The father now proposed to send his son to Europe to finish his education that had been so successfully begun; but as a charter had been obtained for the academy in Philadelphia, about the time he was to have sailed, it was concluded that he should immediately proceed to that city. Accordingly, he entered in the first class in the College of Philadelphia, where he remained four years; and at the first commencement held in that college, on the 17th day of May, 1757, he received the degree of Bachelor of Arts. It is an evidence of the talents, the industry, and of the success, with which Mr. Williamson prosecuted his collegiate studies, and of the high estimation in which he was held by the professors and trustees of the university, that during the time he passed at college, he was successively employed as a teacher, both in the Latin and English schools, connected with that institution. A little anterior to this period, his father and family had removed to Shippensburgh, Cumberland County. His father died in the same year that his son received his first degree.

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* Johnson.

Hugh was appointed his sole executor, and, upon the event of his father's death, took up his residence with his mother at Shippensburgh, where he remained about two years, during which period he, in a great degree, devoted himself to the settlement of his father's estate, personally collecting the debts that were due to it, and which were very much scattered. By the fatigue of body, in connexion with the distress of mind he experienced upon the death of his father, his constitution received a shock which induced an alarming hypochondriasis, that was only relieved by travelling, and a release from the anxiety and care which his attention to business had imposed.

As has already been intimated, Mr. Williamson's mind was early impressed with a sense of religion. It is a remark of an excellent writer, who duly appreciates this union of the intellectual faculties with purity of moral character and conduct in life, "That knowledge only is of value which exalts the virtue, multiplies the comforts, soothes the sorrow, and improves the general felicity of human intercourse."* With Mr. Williamson, this sentiment was not a mere speculative opinion; it entered into the daily practice and pursuits of his life, and that love of truth and virtue which philosophy had taught him as a dignified sentiment, christianity consecrated as a religious duty. With this frame of mind, it was his original intention, and he considered it his duty, to prepare himself for the ministry, at the same time believing that occupation to be the most honourable and useful in which he could be engaged, and for which his piety and education had peculiarly qualified him. "It was remarkable," says a communication which I have received from his family, "that before he entered upon the study of divinity, while yet quite a young man, he visited and prayed with the sick in the neighbourhood, and it was pleasing to the pious of those days to remark the fervency and devotion with which this young layman approached the throne of grace."

During the period of his residence with his mother, then a widow, he devoted all his time not occupied by the business of his father's estate, to the study of divinity, frequently visiting Dr. Samuel Finley, an eminent divine, already mentioned, who at that time preached at East Nottingham township, Chester county, and who then directed his pursuits. In 1759, Mr. Williamson went to Connecticut, where he still pursued his theological studies, and was licensed to preach the gospel. After his return from Connecticut, he was also admitted a member of the presbytery of Philadelphia. He preached but a short time, not exceeding two years, and then his preaching must have been only occasional; he never was ordained, or took charge of a congregation, for his health did not permit him to perform the stated duties of a pastor. The infirm state of his health in early life made it very questionable whether his lungs would bear the exertions of public speaking: these apprehensions were now verified, for he became much troubled with pains and strictures of his chest, which led him to abandon the profession that was the first object of his choice, and to which he was, from a sense of duty, attached. The memorable controversy, too, which took place about that period in the Presbyterian church, between the adherents of Mr. Whitefield, and those who considered themselves as the old and more orthodox party,* also proved to him a source of great disgust, and, I am informed, had great influence in withdrawing him from his theological pursuits: he accordingly left the pulpit, and entered upon the study of medicine. To this science, it appears, he also had already manifested some predilection: his nephew remarks upon this subject "my mother can give but little information respecting the doctor's study of medicine; she however believes, that this science must have been a favourite study with him long before he had determined to attend to it regularly, as she found him, when studying divinity, giving directions respecting inoculation for the small-pox."

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* Wakefield.

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* See Life of the Rev. Dr. Rogers, by Dr. Miller.

In the year 1760, he received the degree of Master of Arts, in the College of Philadelphia, and was immediately after appointed the professor of mathematics in that institution.* He accepted the professorship, regarding it a most honourable appointment, but without any intention of neglecting his medical studies. It had been observed of him very early in life, that he had a strong natural fondness for mathematical investigation, and it was remarked, that while he was a student in college, all his public exercises and disputations partook so much of the mathematical form of reasoning, that he was considered by his fellow-students as an adroit and obstinate antagonist. At the same time, as already hinted, it was equally observable that he had no talent for versification. I have often heard him remark, that the first part of a Spanish proverb implied a severe censure upon him, viz. that "he is a fool who *cannot* make one verse; he is a fool who *will* make two."

On the 8th of October, 1763, as I am informed by my venerable friend, Bishop White, the President of the Board of Trustees of the University of Pennsylvania, Mr. Williamson gave notice of his intended resignation of his professorship; and in 1764, he left his native country for Europe, for the purpose of prosecuting his medical studies at the University of Edinburgh.

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* Works of William Smith, D. D.

He remained in that city, enjoying the advantages of instruction afforded by the lectures of the elder Monro, Whytte, Cullen, Home, Alston, and Dr. John Gregory, the author of the Legacy, and father of the present distinguished professor of the practice of physic in that celebrated seat of learning. During his stay in Edinburgh, Mr. Williamson was occasionally confined to his chamber or bed, by intermitting fevers and pains in the breast, so much so that he had nearly resolved to make a visit to Lisbon, or some other warm climate; but recovering from these complaints at the close of the lectures, he left Edinburgh, made a tour through the northern parts of Scotland, after which he proceeded to London, where he remained twelve months, diligently pursuing his studies, and, as at Edinburgh, by his zeal attracting the notice and kind attentions of his instructers. From London he crossed over to Holland, and proceeded to Utrecht, where he completed his medical education. Having passed the usual examination, in which he displayed his classical and medical attainments, and having submitted to the professors of that University a Latin thesis, he obtained the degree of Doctor of Medicine. He afterwards amused himself with a tour on the continent, from which he returned to his native country in a state of health considerably improved.

After his return, Dr. Williamson practised medicine in Philadelphia for some years with great success, as it respected the health of his patients. but with painful effects as it regarded his own. By the occasional loss of sleep, to which he was necessarily exposed, his constitution soon became considerably impaired; and so acute was his sensibility to the sufferings of the sick, that he seldom had a patient, in imminent danger, without experiencing a febrile excitement of the system. He therefore resolved to abandon medicine, and to attempt the relief of his constitution by mercantile pursuits. Fortunately for the interests of science, and, I may add, for our country, this resolution was not carried into effect until some years after this period. In the meantime, Dr. Williamson remained in the city of Philadelphia, devoted to his favourite literary and philosophical investigations.

Shortly after this time, the attention of the philosophers, both of Europe and America, was directed to an event which was about to take place, of great importance to astronomical science and to navigation: I refer to the transit of Venus over the sun's disk, which occurred on the third day of June, 1769; "a phenomenon which had never been seen but twice by any inhabitant of our earth; which would never be seen again by any person then living; and on which depended very important astronomical consequences."* This subject had already engaged the attention of the astronomers of the other hemisphere, and measures, preparatory to that event, had been adopted; for in the latter part of the year 1767, it had been resolved by the Royal Society of London, to send persons to the South Seas, as a part of the world peculiarly favourable for observing the expected transit.

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* Rush's Eulogium on Dr. Rittenhouse.

This phenomenon, which presented to the American mathematicians and astronomers an ample occasion for the display of their abilities in these departments of science, as might be expected, attracted great attention in the colonies.

At a meeting of the American Philosophical Society, held on the 7th day of January, 1769, Dr. Hugh Williamson was appointed a member of a committee, consisting of Mr. David Rittenhouse, the Rev. Dr. Ewing, Dr. Smith, provost of the college, Mr. Charles Thompson, and some others, eminently skilled in mathematics and astronomy, to observe that rare phenomenon, as it was aptly styled by Dr. Smith.

The contacts of the limbs of Venus and the sun, as observed and drawn up by Dr. Williamson, together with the determination of the sun's parallax and distance, as derived from those observations, are communicated to the world in the first volume of the transactions of the Philosophical Society of Philadelphia.

The observations published on that memorable occasion, by the Rev. Dr. Ewing, Mr. David Rittenhouse, the Rev. Dr. Smith, by professor Winthrop, of Massachusetts, as well as those by Dr. Williamson, and other American astronomers, were considered by the philosophers of Europe, as highly creditable to their authors, and of great importance to the cause of science. By the astronomer royal, the Rev. Mr. Nevil Maskelyne, they were referred to with peculiar notice and approbation:

"I thank you," says that eminent philosopher to his correspondent, the Hon. Thomas Penn, "for the account of the Pennsylvanian observations of the transit, which seem excellent and complete, and do honour to the gentlemen who made them, and those who promoted the undertaking."

Soon after this event, the Philosophical Society of Philadelphia, sensible of the correctness and ability with which the labours referred to had been conducted, and desirous of obtaining additional means of settling the longitude of Philadelphia, Norriton, and other places which had been the sites of their former observations of the transit of Venus, appointed the same committee, of which Dr. Williamson had been an active member, to observe the transit of Mercury, which was to take place on the 9th day of November of the same year. The observations of Dr. Williamson, with the elements of his calculation of that transit, are also contained in the same important volume of the American Transactions.

In the month of September, of the same momentous year, a considerable degree of public alarm was excited by the appearance of a remarkable comet. Its tail was of vast extent, subtending an arch of ten or fifteen degrees. Dr. Williamson, who had reflected much upon subjects of this nature, could not allow himself to believe that comets, more than other heavenly bodies, were destructive masses of fire. Having considered the subject with great attention, he presented to the American Philosophical Society a theory which seems to have been perfectly new, and which he ever claimed as his own.

He alleged that the lucid tail of that comet, which must have been many millions of miles in length, was nothing else than the atmosphere of the comet thrown behind the nucleus as it approached the sun, and illuminated by the refracted rays of the sun's light. I have often heard him remark, that from night to night, with his telescope, he traced a spot immediately behind the nucleus in which there was not any observable light. Hence he inferred, that comets, instead of being infinitely hotter than melted iron, were, in all probability, like Jupiter and Saturn, habitable planets, and in their greatest and least distance from the sun might afford a comfortable residence for people, not materially differing from the inhabitants of this earth in the capacity of bearing cold or heat.

This idea of comets gives a prodigious extent to our ideas of the rational beings with which this solar system may be inhabited. It was not without considerable difficulty that the society could be prevailed upon to publish a theory of comets, so different from, and perfectly opposed to, the received opinions on that subject. But the doctor, after the most rigid examination of his own views, and of the objections which were adduced, persisted in his determination to give them publicity, and it is well known that he always considered his theory of comets the most fortunate of all his conjectures on philosophical subjects. The paper he at that time published has lately been rewritten, and in an improved form has been again communicated to the public in the first volume of the Transactions of the Literary and Philosophical Society of New-York. He concludes that interesting communication with the following exalted view of his subject:

"Having ventured an opinion that every planet and every comet in our system is inhabited, we have only taken a very imperfect view of the astonishing works of the divine architect. There are about three thousand fixed stars visible by the naked eye. Every one of those stars is doubtless a sun, and each of those suns affords light and heat to another system of worlds. Let us only suppose that each of those suns illuminates as many orbs as belong to our system. We shall state the number at two hundred, though it is believed that twice this number of comets, beside the planets, have already been discovered. This would give three hundred thousand worlds. But three thousand is a small number when compared with the whole number of stars that have been discovered. The relative places of fifty thousand stars have been determined by the help of telescopes. Fifty thousand solar systems, each containing at least one hundred worlds! Five millions of worlds all inhabited by rational beings! How do we seem to dwindle into littleness! How small, how few, are the ephemerons of this little globe, when compared with the countless myriads who inhabit five millions of worlds! All those worlds, and every one of their inhabitants, are under the constant care of the Divine Being. Not one of them is neglected.

'Great and marvellous are his works: how terrible his power!' "

In the following year, (1770,) Dr. Williamson prepared and published, through the same channel of communication,* some observations upon the change of climate that had been remarked to take place more particularly in the middle colonies of North America.

The doctor had ascertained that within the last forty or fifty years, the winters had not been so intensely cold, nor the summers so disagreeably warm, as they had been in the earlier settlement of the country; and that during the same period, a very observable change had also taken place in the character of the prevailing diseases; that the fevers which had, for many years, maintained a fatal reign through many parts of this country, were then evidently on the decline; and that inflammatory fevers, with the several diseases of cold seasons, had been observed to remit their violence as the winters had become more temperate. To account for those facts was the object of that communication. The view taken of this subject—of the face and situation of the country—of the influence of prevailing winds—of the effects of clearing, and the subsequent cultivation of the soil, and the illustrations that were adduced from the history of the settlement of other parts of the world, and of their progress in agriculture and civilization, gave an interest to that paper that caused it to be extensively read and circulated. In Europe it received the most respectful notice, and greatly extended the name and fame of its author.

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* Transactions of the American Philosophical Society, &c. vol. I. p. 336. 2d edition.

In a letter which I have lately received from Mr. Jefferson, whose accuracy of observation is only equalled by his extensive researches in literature and science, noticing that production of Dr. Williamson, he observes, " the memoir in the Philosophical Transactions, on the change of climate in America, I have ever considered as a remarkably ingenious, sound, and satisfactory piece of philosophy." The publication of this interesting paper, with those which had preceded it, procured for Dr. Williamson, not only the notice of the various literary institutions of his native country, into which he was shortly after introduced as an honorary member, but they obtained for him abroad the most flattering distinctions. The Holland Society of Sciences —the Society of Arts and Sciences of Utrecht—conferred upon him, in the most honourable manner, a membership in those distinguished institutions; and about the same period he received from a foreign university, I believe from Leyden, as the further reward of his literary labours, the degree of Doctor of Laws.

I shall again advert to the subject of the last mentioned publication, when I may have occasion to notice the more elaborate observations of Dr. Williamson on climate, one of the works of his later years.

New scenes now opened upon his view. From some letters addressed by Dr. Williamson to his friend, the late Rev. Dr. Ewing, now in the possession of his family, it appears that in 1772, the Doctor made a voyage to the West India islands, for the purpose of collecting subscriptions for the academy of Newark, in the state of Delaware, of which institution he and Dr. Ewing were both trustees. "His stay in the islands, (says the sensible writer* of the communication with which I have been favoured,) seems to have been protracted by severe bilious fevers; from the effects of which, he almost despaired of recovering his former state of health: his zeal, however, in the cause of literature, was not abated, and finally he procured a large subscription. On his way home, he passed a short time in Charleston, where he received some liberal fees for medical advice."

Exceedingly anxious for the prosperity of the academy, while he was yet in the islands, he planned a tour through Great Britain for the benefit of that institution; his project was communicated to the trustees, and received their approbation: accordingly, in the autumn of 1773, Dr. Williamson, in conjunction with Dr. Ewing, afterwards Provost of the University of Pennsylvania, was appointed to make a tour through England, Scotland, and Ireland, to solicit further benefactions for the same academy of Newark.

Thus honourably associated, and the reputation they had acquired from their late astronomical observations having preceded them, they were received with great attention by the literati, and other men of influence in Great Britain: a circumstance in itself, highly favourable to the object of their mission. Their success, however, was but indifferent, owing to the irritation of the public mind against the colonies, which about that time was already considerable; yet, their characters as men of learning, procured them much personal attention, and some money.

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* Mrs. Hall, of Philadelphia, daughter of the late Dr. Ewing.

The constant hope of accommodation with the colonies, and the example of the King, from whom they received a liberal donation, notwithstanding his great displeasure towards his American subjects, encouraged them to persevere in the business of their mission until the autumn of 1775. Hostilities having then commenced, Dr. Ewing returned to America, leaving Dr. Williamson in London, who determined to remain, and to make some further efforts for the establishment of his favourite academy.—But I must return to some circumstances of importance which here claim our notice.

The vessel in which Dr. Williamson had engaged passage for Europe, lay in the harbour of Boston, to which place he had proceeded, and was waiting for her sailing at the very time at which that remarkable circumstance took place, the destruction of the tea of the East India Company.* Upon Dr. Williamson's arrival in England, he was the first to report to the British Government that occurrence; and, after a private interview with Lord Dartmouth, was examined on the subject before his Majesty's Privy Council: that examination took place on the 19th of February, 1774. On that occasion, Dr. Williamson ventured to declare, that, if the coercive measures of Parliament were persisted in, nothing less than a civil war would be the result. Time soon verified his prediction; but the want of correct information on the part of the British ministry, as to the state of public feeling in this country, seems almost incredible. Lord North himself has been heard to declare, that Dr. Williamson was the first person who, in his hearing, had even intimated the probability of such an event.*

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* According to the regulations of the Custom-House at Boston, every vessel, not entered within twenty days after her arrival, was liable to seizure by the government vessels then in the harbour. As respected the tea ships, the inhabitants of Boston waited nineteen days; during which period they daily solicited of the governor a permit, that those vessels with their tea might return to the ports whence they had come. This request was peremptorily refused. On the evening of the nineteenth day, between the hours of seven and twelve o'clock, the time at which it would have been seizable by government, the tea was destroyed

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by a party of Americans. For many particulars relative to this affair, I am indebted to a gentleman, now in my hearing, (General Ebenezer Stevens,) who was one of those concerned in the act of destroying the tea, and who bore a conspicuous part in the subsequent events of the Revolution.—See also *Almon's Remembrancer*, vol. I. *Collection of the Mass. Histor. Society*, vol. II.

* While Dr. Williamson was at Boston, he became acquainted with Messrs. Adams, Warren, Otis, and other selectmen. On the 22d of December, 1773, a few days after the tea was destroyed, he sailed from Boston for London in a ship that belonged to Mr. Hancock. Governor Hutchinson had sent his despatches by a brig that sailed some days before the ship. She belonged to a man of other politics. In that brig sailed three gentlemen passengers. The ship arrived six days before the brig. In the mean time, Dr. Williamson, in conversation with Lord Dartmouth, had detailed the events at Boston. The three gentlemen who arrived in the brig, were immediately examined, and their evidence, signed and sworn to before the Privy Council, was afterwards communicated to Parliament. Dr. Williamson being sent for, was at first examined before two or three public officers, about the 1st of February, 1774, preparatory to his being examined before the Privy Council. From the several questions that had been put to him, and

We now come to an event, memorable by the commotion it excited at the time, and by the magnitude of the consequences which have since arisen from it; I refer to the discovery of the celebrated Letters of Hutchinson and Oliver: and here I beg leave to call your notice to a few of the earlier circumstances of the late revolutionary war, in order to communicate a fact hitherto unrevealed.

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the direct answers, he concluded that no satisfactory knowledge could have been acquired of the late incidents in Boston: therefore, when he returned to his lodging, he wrote a regular detail of the several material incidents he had observed in Boston, which included an answer to the several questions that had been put to him, and a statement of sundry facts. When he attended the next day at the Horse-Guards, where the Privy Council sat, an officer read to him what had been written as his answer to the questions that had been propounded. He objected to the whole as incorrect, and handed him the narrative he had written. After that officer had informed the Council of the Doctor's objections to the answers as written, the Doctor was called in, and the Lord President informed him, that they would receive his narrative, but wished to ask him a few more questions. The clerk wrote his answer to one of the questions so very incorrectly, as to convey an idea very different from what was intended—of this the Doctor complained, and the clerk was properly reprimanded. When the examination was finished, an officer (the Attorney General) handed the Doctor a book, and a pen, that he might swear and sign his name. He laid down the pen—requesting their lordships to believe, that he was not in the habit of saying things that he was not willing to swear—But although he had studied medicine, and not law, he knew so much of the law as that a witness should not be examined concerning any fact that might endanger a man's life, unless the party was present by whom he might be interrogated. This, he said, was counted to be the law in England; he could not tell whether it would pass for law in America: "*But if the measures were about to be pursued by Parliament against America, which out of doors were said to be intended, the time was not far distant, when his native country would be deluged with blood.*" "*This hand,*" said he, "*shall be guiltless of that blood.*" The Lord Chancellor assured him, that the examination and oath now taken, could not be used against any man

Although the disturbances which originated in the famous stamp act, had nearly subsided with the repeal of that noxious measure, and returning sentiments of friendship were every day becoming more manifest, yet new obstacles to a permanent reconciliation appeared in the attempts of the British administration, to render certain officers of the provincial governments dependent on the crown alone. This measure of the court gave

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who might be prosecuted, and tried for life; and the president declared upon his honour, that it had been the custom, time out of mind, to examine witnesses upon oath before the Privy Council, consequently this could not be considered as setting a novel precedent. Dr. Williamson then subscribed the narrative. The examinations of the other three gentlemen were communicated to Parliament, but Dr. W. understood that his examination had not been communicated, nor could he think of any reason why it should have been suppressed, unless that he had observed in the course of his narrative, that the selectmen in Boston caused a guard to be placed over the tea ships, for the double purpose, as they alleged, of preventing the tea from being smuggled on shore, and of preventing evil-minded persons from destroying the ships or tea; for they had determined that both should return to London. As that fact seemed to invalidate the charge of the premeditated intention of the selectmen to destroy the tea, which charge, however, was of great use to the administration in their desire to cripple the town of Boston, it may have caused the suppression of his evidence.*

It is a remarkable circumstance, that neither Governor Hutchinson, of Massachusetts, nor any other man in the service of the governor, should have had the candour to intimate to the Prime Minister, that resistance might be the effect of severe measures.

In October, 1776, Lord North, having sent for Mr. Ralph Izard, then in London, and Dr. Williamson, to ask their opinion concerning the operation of a particular law, told the Doctor that he, in presence of the Privy Council, was the first person that ever had intimated, in his hearing, the probability of a civil war in America.

The particular facts contained in this note, were communicated to the writer by Dr. Williamson, a short time before his decease.

* The author of this memoir, is in possession of the original draft of Dr. Williamson's narrative communicated to the Privy Council.

particular offence to the colony of Massachusetts, from the peculiarly obnoxious character of their governor, who at times, impelled by avarice and by the love of dominion, had, in furtherance of his schemes of self-aggrandizement, uniformly manifested the most determined support to the views and measures of the mother country.

However discreditable to his reputation it may be, certain it is, that Governor Hutchinson was secretly labouring to subvert the chartered rights of the colony, whose interests he had sworn to protect. His agency in procuring the passage of the stamp act was more than suspected, and apparently upon reasonable grounds.

The illustrious Franklin, who had recently rendered himself conspicuous by his examination before a committee of the British Privy Council, and who at this period resided in London, as agent for the colonies of Pennsylvania and Massachusetts, obtained possession, through the agency of a third person, of certain letters written by Governor Hutchinson; Secretary Oliver, afterwards Lieutenant-Governor; Charles Paxton, Esquire, and other servants of the crown; and sent by them from Boston to Thomas Whately, Esquire, Member of Parliament, and a private Secretary of Lord Grenville.

In these letters, the character of the people of Massachusetts was painted in the most odious colours, and their grievances and proceedings misrepresented by falsehoods the most glaring and unfounded.

It would seem to have been equally the object of Governor Hutchinson, and his coadjutors, to furnish excuses for the ministry, already sufficiently disposed to adopt every measure of severity towards the colonists, through the prejudiced representations of Bernard and his commissioners; and to poison the minds of the opposition, who had, on most occasions, proved themselves their warm advocates.

Dr. Franklin lost no time in transmitting these letters to his constituents at Boston. "The indignation and animosity which were excited, on their perusal, knew no bounds. The House of Representatives agreed on a petition, and remonstrance, to his Majesty, in which they charged their Governor and Lieutenant-Governor with being betrayers of their trust, and of the people they governed; and of giving private, partial, and false information. They also declared them enemies to the colonies, and prayed for justice against them, and for their speedy removal from their places."*

Their petition and the remonstrance of the people of Massachusetts were communicated to his Majesty's Privy Council by Dr. Franklin, in person, and after hearing by that board, the Governor and Lieutenant-Governor were acquitted. It was on this occasion that Mr. Wedderburn, (afterwards Lord Loughborough) who was employed as counsel on the part of the Governor, pronounced his famous philippic against Dr. Franklin; which has always been considered among the most finished specimens of oratory in the English language. In this speech, he charged that venerable character with having procured the letters by unfair means. "The letters could not have come to Dr. Franklin (says Mr. Wedderburn) by *fair means*—the writers did not give them to him, nor yet did the deceased correspondent, [Mr. Whately,] who, from our intimacy, would have told me of it: nothing then will acquit Dr. Franklin of the charge of obtaining them by fraudulent or corrupt means, for the most malignant of purposes: unless he stole them from the person who stole them. This argument is irrefragable.

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* Memoirs of the Life and Writings of Franklin, 4to. p. 183. Lond. ed. 1818.

"I hope, my lords, you will mark and brand the man, for the honour of this country, of Europe, and of mankind. Private correspondence has hitherto been held sacred at times of the greatest party rage; not only in politics, but religion." "He has forfeited all the respect of societies and of men. Into what companies will he hereafter go with an unembarrassed face, or the honest intrepidity of virtue? Men will watch him with a jealous eye—they will hide their papers from him, and lock up their escrutoires. He will henceforth esteem it a libel to be called a *man of letters*, HOMO TRIUM LITERARUM."*

A controversy having taken place in the public prints, between Mr. William Whately, (the brother of the secretary to whom the letters had been addressed, and who was now dead,) and Mr., afterwards Sir John Temple, arising out of the manner in which the letters of Governor Hutchinson had been procured and transmitted to Boston, and which dispute was followed by a duel between those two gentlemen, Dr. Franklin, in order to prevent any further mischief, published a letter in the newspapers, in which he assumed the entire responsibility of sending the papers to America. Alluding to this letter of Dr. Franklin, Mr. Wedderburn continued:

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* Memoirs of Franklin, 4to. vol. I. Appendix. See also the letters of Governor Hutchinson, and Lieutenant Governor Oliver, &c. and remarks thereon, by Israel Maudit, with the assembly's address, &c. 2d ed. Lond. 1774.

"But he not only took away the letters from one brother, but kept himself concealed till he had nearly occasioned the murder of the other. It is impossible to read his account, expressive of the coolest and most deliberate malice, without horror. Amid these tragical events, of one person nearly murdered, of another answerable for the issue; of a worthy governor hurt in his dearest interest; the fate of America is in suspense. Here is a man, who with the utmost insensibility of remorse, stands up and avows himself the author of all: I can compare it only to Zanga, in Dr. Young's Revenge—

'Know then 'twas I—
I forged the letter—I disposed the picture—
I hated—I despised—and I destroy—'

"I ask, my lords, whether the revengeful temper, attributed by poetic fiction only to the bloody African, is not surpassed by the *coolness* and *apathy* of the wily American?"

The speeches of Mr. Dunning, afterwards Lord

Ashburton, and Mr. Lee, who appeared as counsel in behalf of the assembly of Massachusetts, were never reported at length; but they chiefly insisted upon the noxious parts of the letters of Hutchinson and Oliver.

By the preceding extracts from the speech of Mr. Wedderburn, it will be seen that the chief subject of his vehement invective was the disclosure, by Dr. Franklin, of what was termed by the Parliamentary orator, a private correspondence.* But

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* Dr. Priestley, who was present when Lord Loughborough pronounced his violent invective against Dr. Franklin, before the Privy Council, has published an interesting letter respecting Dr. Franklin's behaviour on that occasion. It is well worth a perusal, and may be found in the London Monthly Magazine, for 1804, and also in Priestley's Memoirs and in the Memoirs and Life of Franklin, vol. I. In a biographical work of some pretensions, the author, in his strictures on the character and services of Lord Loughborough, thus expresses himself: "His celebrated philippic pronounced against Dr. Franklin, before the Privy Council, is not perhaps surpassed by those of Demosthenes against Philip, or Cicero against Anthony."

I am constrained to enlarge this note by inserting the words of an American writer, (Mr. Walsh,) whose just sentiments are enhanced by the elegant and classical language in which they are conveyed.

"The discussion of the merits of the petition before the Privy Council, took place on the 29th of January, 1774; Franklin was present, accompanied by some few friends, and the lawyers employed for the colony. Mr. Wedderburn, the Solicitor General of the Crown, appeared as counsel for Hutchinson and his accomplices; or, rather, as the gladiator of the ministers, who had fixed upon this occasion for the prostration of the American advocate, and had assembled a number of their friends to witness the edifying spectacle. Wedderburn gave himself little trouble about vindicating his nominal clients, but assailed the intended victim with the most opprobrious charges, and the most vehement invective. He held him forth as 'a thief and a murderer;' as, 'having forfeited all the respect of societies and of men.' As he alternated his abuse with humorous sarcasms, the members of the council universally laughed aloud, and the retainers of the ministry joined in the chorus. Franklin betrayed not the least emotion; he saw and heard with calm the truth is, these letters could not be considered in any wise as private; but were as public as letters could be. To use the emphatic language of Dr. Franklin himself, "They were not of the nature of private letters between friends; they were written by public officers to persons in public stations, on public affairs, and intended to procure public measures: they were therefore handed to other public persons, who might be influenced by them to produce those measures. Their tendency was to incense the mother country against her colonies, and by the steps recommended, to widen the breach, which they effected. The chief caution expressed with regard to privacy was, to keep their contents from the colony agents, who, the writers apprehended, might return them, or copies of them to America. That apprehension was, it seems, well founded; for the first agent who laid

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dignity; he only remarked to one of his lawyers, after the predetermined absolution of the culprits, that he was sincerely sorry to observe the lords of council behave so indecently, and to find 'that the coarsest language could be grateful to the politest ear.' This scene is one which calls for national commemoration, by the pencil of a Trumbull. It overwhelms us with astonishment, when we reflect that the proper question for consideration, was no other than the solemn complaint and prayer of an important province; that the man thus treated was the representative of that, and three other considerable provinces; the boast and idol of all the colonies, then in a state of fearful incalescence; venerable for his age, his genius, his discoveries and writings as a philosopher and a moralist; one whom all Europe besides was emulously seeking to honour; and of whom the exalted countryman of Wedderburn, Lord Kames, wrote not long after in his Sketches of the History of Man. 'Dr. Franklin, of Philadelphia, a man who makes a great figure in the learned world, and who would make a still greater figure for benevolence and candour, were virtue as much regarded in this declining age as knowledge." *Delaplaine's Repository of the Lives and Portraits of Distinguished Americans*, vol. II.

his hands on them, thought it his duty to transmit them to his constituents."* In a letter on this subject, addressed to a friend, he also observes: "On this occasion I think fit to acquaint you, that there has lately fallen into my hands, part of a correspondence, that I have reason to believe laid the foundation of most, if not all, of our present grievances. I am not at liberty to tell through *what channel* I received it; and I have engaged that it shall not be printed, nor any copies taken of the whole, or any part of it; but I am allowed to let it be seen by some men of worth in the province, for their satisfaction only. In confidence of your preserving inviolably my engagement, I send you enclosed the original letters, to obviate every pretence of unfairness in copying, interpolation, or omission."†

Thus, Dr. Franklin performed a service which his situation as a public agent required of him. But notwithstanding the secrecy with which it had been conducted, the letters were soon after published by the assembly of Massachusetts; not however until after the appearance of other copies in Boston, produced by a member who, it was reported, had just received them from England.

I must be permitted to make an extract on this subject, from a writer to whom the literature of this country is largely indebted, and whom I have just quoted.

"The celebrated affair of Oliver and Hutchinson's letters, which occurred in December, 1772.

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* Franklin's Letter to the printer of the Daily Advertiser.

† Memoirs, 4to. p. 191.

exemplified the complete predominance in the mind of Franklin, of love of country, and the sense of official duty, over every suggestion of a temporizing prudence, and every consideration of personal advantage. When accident put into his hands the libellous and treacherous letters of the governor, lieutenant-governor, and other royal servants at Boston, it was enough for him to believe that they ought to be communicated to those whom they particularly concerned, to fulfil the obligation at once, fearlessly committing the ulterior results to Providence. He took, however, in pursuance of the high motives upon which he acted, every precaution in his power against sinister consequences. He kept inviolably, to the end of his life, under a severe trial of fortitude, the engagement of secrecy which he had contracted, as to the names of the individuals from whom he had received the letters; but though he foresaw a tempest of obloquy, he did not hesitate a moment to disclose, in the most public manner, his own share in the transaction, as soon as he knew the disclosure to be necessary for the prevention of mischief to an individual erroneously implicated."* I may add, that in order to prevent any violation of his engagement to the person from whom he had received the letters, which the interrogatories of the court might have compelled, he thought it incumbent on him to return to America.†

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* Delaplaine's Repository, vol. II.

† "When Dr. Franklin put in his answer to the bill in Chancery, which had been filed against him in the name of Mr. Whately, he demurred to two of the interrogatories which it contained, and by which

But it is time that I should declare to you, that this third person from whom Dr. Franklin received these famous letters, (and permit me to add, that this is the first time the fact has been publicly disclosed,) was Dr. Hugh Williamson.

I have before stated his mission in behalf of the academy. Dr. Williamson had now arrived in London. Feeling a lively interest in the momentous questions then agitated, and suspecting that a clandestine correspondence, hostile to the interest of the colonies, was carried on between Hutchinson and certain leading members of the British Cabinet, he determined to ascertain the truth by a bold experiment.

He had learned that Governor Hutchinson's letters were deposited in an office different from

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he was required to name the person from whom he had received the letters in question, and also the person in America to whom they had by him been transmitted; and declined making any disclosure of their names. This demurrer was, however, overruled, and he was ordered to answer these interrogatories; but feeling that his doing so would be a violation of his engagement to the person from whom he had received the letters, and probably injurious to the person to whom they had been sent, he thought it incumbent on him to return to America, and thereby avoid the breach of his engagement; and he appears to have done this conscientiously, and so completely, that the person from whom the letters were received was never ascertained; nor were any of the conjectures respecting that person founded upon, or suggested by, any infidelity or indiscretion on the part of Dr. Franklin. He was not, however, under an equal obligation to secrecy in regard to the person to whom the letters were *immediately* transmitted: and he therefore confidentially informed a friend of his, (Dr. Bancroft, to whom the editor is indebted for this note,) that they had been sent to Mr. Cushing, then speaker of the House of Representatives of the Massachusetts Bay, with whom it was Dr. Franklin's duty, as agent for the assembly of that province, to correspond." See page 195 of Franklin's Memoirs, as published by William Temple Franklin, Esq. London, 4to.

that in which they ought regularly to have been placed; and having understood that there was little exactness in the transaction of the business of that office, (it is believed it was the office of a particular department of the treasury,) he immediately repaired to it, and addressed himself to the chief clerk, not finding the principal within. Assuming the demeanour of official importance, he peremptorily stated, that he had come for the last letters that had been received from Governor Hutchinson and Mr. Oliver, noticing the office in which they ought regularly to have been placed. Without any question being asked, the letters were delivered. The clerk, doubtless, supposed him to be an authorized person from some other public office. Dr. Williamson immediately carried them to Dr. Franklin, and the next day left London for Holland.

I received this important fact from a gentleman of high respectability, now living; with whom, as the companion and friend of his early days, Dr. Williamson had entrusted the secret.*

By this daring measure, was detected and put beyond question, the misrepresentations and design of Hutchinson and his associates; and, perhaps, no event in the previous history of the provinces excited more bitter indignation, or was calculated to call for opposition to the measures of Great Britain, to which these misrepresentations had given rise.

The lively interest, and the conspicuous part which Dr. Williamson took in public affairs, did not prevent him, while in England, from bestowing a portion of his attention upon scientific pursuits. Electricity, whose laws had been recently determined by the discoveries of Dr. Franklin, and by his genius introduced among the sciences, was then a study, which, like chemistry at the present day, largely engrossed the minds of philosophers. In conjunction with Dr. Ingenhouz, Mr. Walsh, Mr. John Hunter, and Dr. Franklin, he frequently instituted electrical experiments, to which I have often heard him refer with juvenile feelings, at the same time professing his ardent attachment to this branch of knowledge. The only paper which bears testimony to his investigations on this subject, is that entitled, "Experiments and Observations on the Gymnotus Electricus, or Electrical Eel," which was first published in the Philosophical Transactions of the Royal Society of London, for the year 1775, and has since been reprinted in the abridgment of that work.* Like the experiments of Mr. Walsh, those of Dr. Williamson led to a belief that the shock given by the gymnotus electricus, was truly an electrical phenomenon. The following are the results derived from the experiments which Dr. Williamson instituted on that occasion:

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* See additional documents.

"1st. That the Guiana Eel has the power of communicating a painful sensation to animals that touch or come near it. 2d. That this effect depends entirely on the will of the eel; that it has the power of giving a small shock, a severe one, or none at all, just as circumstances may require. 3d. That the shock given, or the principal sensation communicated, depends not on the muscular action of the eel, since it shocks bodies in certain situations at a great distance; and since particular substances only will convey the shock, while others, equally elastic or hard, refuse to convey it. 4th. That the shock must therefore depend on some fluid which the eel discharges from its body. 5th. That as the fluid discharged by the eel affects the same parts of the human body that are affected by the electric fluid; as it excites sensations perfectly similar; as it kills or stuns animals in the same manner; as it is conveyed by the same bodies that convey the electric fluid, and refuses to be conveyed by other bodies that refuse to convey the electric fluid: it must also be the true electrical fluid; and the shock given by this eel must be the true electrical shock," Finally, from these and sundry other experiments, Dr. Williamson was also led to believe, "that the gymnotus has power superior to, or rather different from, those of the torpedo, or electric ray."—Time will not allow me to point out in what respects the conclusions of Dr. Williamson, as deduced from his own investigations, coincide with, or differ from, those subsequently made on the same animal, by Baron Humboldt.*

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* Philosophical Transactions of the Royal Society of London, abridged by Hutton, Shaw, and Pearson, vol. XIII. page 597.

Dr. Williamson had scarcely made his tour through Holland and the Low-Countries, when the news of the declaration of American Independence reached him. He now concluded to return to his native land. He proceeded to France, and after a short time spent in that kingdom, during a great part of which he was confined by sickness, he sailed from Nantz in December, for Philadelphia, at which place he did not arrive before the 15th of March. The ship in which he sailed was captured off the Capes of Delaware, but he, with another passenger, escaped in an open boat with some very important public despatches, of which Dr. Williamson was the bearer.

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* See his Personal Narrative, vol. IV.

The American army, at the period of Dr. Williamson's return from Europe, was in some measure organized, and every office in the Medical Staff, or in the line, that he could with any propriety accept, was filled up. True it was, that he had strong claims to public employment, and the proofs were in his possession; but those claims he could not at that time urge, without endangering individuals who were on the other side of the Atlantic, nor could he do it without a breach of confidence, a species of crime that he cordially abhorred. He resolved, therefore, to remain in private life, waiting for opportunities which he trusted would present themselves in the course of a dangerous struggle. In the mean time, he undertook a journey to Charleston, in South Carolina, with a younger brother,* on a mercantile speculation. His brother sailed from Charleston for a neutral port in the West Indies. The Doctor, in company with another gentleman, purchased a sloop in

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* Captain John Williamson.

Charleston, and having loaded her with a suitable cargo intended for Baltimore, ordered her for Edenton, in North Carolina; but before his arrival at Edenton, General Howe, with the British army, on his way to Philadelphia, had entered Chesapeake Bay. That circumstance determined the Doctor to continue in Edenton, from which he afterwards traded to neutral islands in the West Indies; but while he thus continued his mercantile connexion with his brother, then also engaged in the West India trade, he determined to resume the practice of medicine: this he did with the same success as he had done formerly at Philadelphia, and in a short time acquired the confidence of the people of Edenton.

During the period of his residence there, he was invited to Newbern, for the purpose of communicating the small-pox to such as had not experienced the benefits of inoculation. These circumstances in part contributed to spread the name of Dr. Williamson, and to lay the foundation of that fame and confidence which he afterwards obtained in the State of North Carolina.

The Doctor had taken an early opportunity of informing the governor of that province, that if any circumstance should occur in the course of the war, in which he could be of use to the state, he might immediately command his services. It is known that the British troops took possession of Charleston in the winter of 1779—1780, and that the assembly of North Carolina ordered a large draft to be made from their militia, of from four to six thousand men, who should join the regular troops then ordered for the relief of South Carolina. The command of the North Carolina militia was given to their late Governor Caswell, with the rank of Major General. The General, putting Dr. Williamson in mind of a former promise, handed him a commission, by which he found himself at the head of the medical department, as physician and surgeon.

An occasion now presented itself, in which the Doctor had an opportunity of displaying his firmness of character, his humanity, his professional skill, and his incorruptible adherence to the cause in which he had embarked. On the morning after the battle near Camden, on the 18th of August, 1780, which the Doctor witnessed, he fell in with General Caswell, and requested of him to give him a flag, observing that, although a great part of the militia had behaved ill, yet many of them, as he must have observed, fought with distinguished bravery, and that a considerable number, in consequence, were wounded and made prisoners. They claimed our attention. The General advised him to send in some of the regimental surgeons, observing that his duty did not require that service from him. The Doctor replied, that the regimental surgeons, such of them as he had seen, refused to go; being, as he suspected, afraid of the consequences. But, said he, if I have lived until a flag will not protect me, I have outlived my country; and, in that case, have lived one day too long. To this observation, no reply was made—he obtained a pass, and the necessary instructions.

He remained two months with the enemy in Camden, during which time he rendered very essential services to the prisoners committed to his care. Such, too, was the estimation in which the medical skill of Dr. Williamson was held by the enemy, that during the illness of one of their general officers, in which the advice of a physician became necessary, his attendance was requested in addition to that of the surgeons constituting their medical department.

About the middle of October, cold mornings and evenings proved injurious to convalescents who had no warm clothing. It now became desirable that some coarse woollens should be obtained. The Doctor, who had brought with him a small supply of gold to obviate accidents, availed himself of that cash to purchase the clothing that became necessary for the prisoners under his charge.

The British troops, in the autumn of 1780, took possession of Portsmouth and Norfolk, and made an incursion into North Carolina: a camp was directed to be formed near the Great Dismal, for the defence of the state. General Gregory, who had distinguished himself in the action near Camden, having been twice wounded with a bayonet while bringing off his brigade, was appointed to the command in that department; and at his particular request, Dr. Williamson was permitted to serve with him. This was a pleasing circumstance to the Doctor, for as a winter campaign was expected, he wished to have an opportunity of ascertaining, by actual observation, how far careful attention to the diet, dress, and comfortable lodging, might contribute to preserve the health and lives of soldiers in their encampment.

The General made choice of a strong position within the borders of Virginia, about ten miles from the British advanced post, and orders were issued that the Doctor's instructions should be respected in every thing that might contribute to the comfort and health of the troops. A tent or hut, of sufficient size to lodge twelve or fourteen men, was immediately directed to be built on dry sandy ground. Dr. Williamson attended in person, and superintended the position of every piece of timber entering into its construction, and even overlooked the formation of the several drains leading from it. That hut became the general model for such as were afterwards erected, and the Doctor selected the ground on which all others were to be constructed. To the diet of the soldiers his attention was also particularly directed; believing that fluid nourishments, by their effects in promoting perspiration, and preserving a healthy state of the excretions in general, are better calculated to guard the body against febrile diseases, he made it a subject of his care to provide the troops with a plentiful supply of soups and other liquid nourishments: for this purpose, while the soldiers remained on that ground, he directed that each mess, consisting generally of eight or ten persons, should detach a man from day to day, whose particular duty it was made to collect the various esculent vegetables that could be obtained in that neighbourhood; the Doctor even took the direction of the manner in which their nourishment should be prepared.

There is much reason to believe, that two-thirds of the complaints by which military men suffer, originate in the circumstance of sleeping too near the moist ground, by which the perspiration is checked or moisture is absorbed, that, in most cases, is charged with putrescent vegetable matter. The Doctor was fully impressed with this truth; and accordingly adopted the means of securing to his men a dry and comfortable lodging. As many trees in that country are loaded with moss, (the *Tillandsia Usneoides* of Linnæus,) he directed that every man should sleep on a bed of that moss, or of dried leaves, so as to afford perfect security against any moisture that might arise from the soil.

The sick and wounded were lodged in close and warm houses. They were also plentifully supplied with the tea prepared from the leaves of the Yapon, or *Ilex Cassine Peragua*, *Linn.* a plant which flourishes on the banks of Carolina, affords an excellent beverage, and is employed by many as a substitute for the teas of China. When the use of milk was indicated, that article was also provided for the sick, and at the Doctor's expense. This experiment exceeded his most sanguine expectations; for although they were in camp during the winter, (never less of the North Carolina militia than five hundred, and on some occasions, including the addition of the Virginia militia, the number amounted to twelve hundred men,) they lost but two during the period of six months; nor did any man obtain a furlough on account of indisposition.

Early in the spring of 1782, Dr. Williamson took his seat as a representative of Edenton, in the House of Commons of North Carolina. In that assembly he fortunately met with several members, whose brothers, sons, or other connexions, he had served in the army, or while they were prisoners. Those services were not forgotten. It was to be expected that a gentleman who had seen much of the world, and whose education had been so extensive, could hardly fail, with the aid of moderate oratorical abilities, to become an influential member in a deliberative body. Such in fact he proved. Among other bills which he introduced with success, we find one for erecting a court of chancery, which had often been attempted, in vain, in that state. It may be presumed, that old members, who had been accustomed to conduct the business of that house, were not gratified with being left in the minority by a gentleman who was, at that time, comparatively a stranger in their state. Yet when the election came on for members of congress, those very gentlemen added their influence to that of the friends he had acquired in the army, and he immediately was sent to the general congress without opposition. He continued at the head of the delegation for three years, the longest time that any member was then permitted to serve.

During the three years in which he was not eligible to hold a seat in that body, he served the state occasionally in its legislature, or in some other capacity.

In the year 1786, he was one of the few members who were sent to Annapolis, to revise and amend the constitution of the United States; and who, finding that they had not sufficient powers to do any thing effectual, recommended to the several states to make another choice of delegates, and to invest them with the requisite powers. In that year Dr. Williamson published a series of Essays, deprecating paper currency, and recommending an excise to be imposed. In the year 1787, he was one of the delegates from North Carolina, in the general convention at Philadelphia, who formed and signed the present constitution of the United States.

As the State of North Carolina had at that time in circulation, two large emissions of paper money, which were a legal tender, and which had depreciated to less than half of its nominal value, we are not surprised that a majority of its citizens should have looked on the federal constitution with an evil eye; for debtors, as we presume, in most countries form the majority. It followed that the Doctor, who advocated the new constitution with great zeal as well as ability, lost a portion of his popularity in the state he had represented: he was, nevertheless, again chosen in December, 1787, by the general assembly, to take his seat in congress the succeeding spring, when he would be again eligible, having been three years absent from that body. The assembly at the same time passed a law for a general state convention, to be held at Hillsborough, in July, 1788, for the purpose of determining upon the constitution that had been proposed. The convention, after much debate, adjourned on the 2d of August, having refused to adopt the proposed constitution by a majority of more than two to one, viz. one hundred and eighty-four to eighty-four.

The next general assembly, in December, 1788, passed a law, calling another convention, to meet in the following year. It may be recollected, that eleven of the states having adopted the new constitution, it was immediately after carried into operation, and the first congress met in New-York, in the year 1789. It happened a short time after that congress met, of which Dr. Williamson was a member, several small vessels laden with naval stores, arrived from North Carolina at the port of New-York. The Collector of the customs refused them entrance, unless they should pay the alien duty, which was six to one of the domestic. Dr. Williamson, who continued in New-York, after the dissolution of the old congress, as a commissioner to settle the accounts of North Carolina with the United States, drew up and presented to congress a spirited protest against the decision of the Collector; at the same time urging the fact, that North Carolina had not by any act forfeited her claim to be considered as one of the United States. This protest, in twenty-four hours, produced a law, by which the Carolina vessels were allowed to enter upon paying the domestic tonnage. By that interposition and attention to the interests of North Carolina, the Doctor more than regained his former popularity. When the first convention sat, he was attending in congress; but he was chosen, and attended as a member of the second convention in 1789, by which the constitution was adopted by a majority of two to one. The Doctor's congressional career was now to terminate. He had been chosen a representative from North Carolina, in the first and second congress; but, desirous of retiring from political life, he, at a new election, declined being a candidate.

Before I pass on to other circumstances connected with the career of Dr. Williamson, I beg to be indulged in one or two remarks on the character and influence of his political life. We have seen, that as a representative of the people in the legislature of North Carolina, and in the supreme council of the nation, he was occupied many years. No man, I believe, ever enjoyed in a larger degree the confidence of his constituents, for integrity of conduct; and the influence of his character will be readily appreciated, when we advert to the many important services he effected during the most eventful period of our political history.

He was anxious to prove himself worthy of the high trust reposed in him, nor did he ever permit any private or selfish views to interfere with considerations of public interest. As chairman of numerous committees,—as the mover of important resolutions,—as the framer of new propositions, and new laws,—he devoted the best energies of an active mind, and was ever prominent in the business of the house. In debate, his elocution was striking, but somewhat peculiar. The graces of oratory did not belong to Dr. Williamson; yet the known purity of his intentions, his inflexible de votedness to the interests of his country, and the unblemished tenour of his private life, awakened an attention which was well supported by the pertinency of his observations, the soundness of his reasoning, and the information he possessed upon every subject to which he directed his attention.

While in congress, his duties as a legislator were his exclusive study; and this advantage seldom failed of a success which was denied to the lengthened debate and declamation of his opponents.

In his answer to a letter enclosing the thanks of the general assembly of North Carolina, for his long and faithful services, referring to his own conduct, he observes, "On this repeated testimony of the approbation of my fellow-citizens, I cannot promise that I shall be more diligent or more attentive to their interests: for ever since I have had the honour to serve them in congress, their particular interest, and the honour and prosperity of the nation, have been the sole objects of my care; to them I have devoted every hour of my time."

Although Dr. Williamson might not captivate by the graces of elocution, he possessed a remarkable quickness in perceiving and comprehending the several bearings of a question; and if eloquence be correctly defined by Dr. Johnson, "the power of overthrowing an adversary's argument, and putting your own in its place," then Dr. Williamson may, indeed, be pronounced an orator; for in detecting the weak and defenceless points of the adversary's citadel, he discovered no less adroitness, than in the force and strength with which he followed up the combat. He rarely occupied the house with what is called a set speech; but in his desultory observations frequently appeared a knowledge of the principles of legislation, which could only be furnished by a mind enriched by experience, and deeply versed in the history of man. How well his services were appreciated, is evinced by the repeated vote of thanks with which he was honoured by the Legislatures of Pennsylvania and North Carolina. I shall add to their approbation of the public part of Dr. Williamson's character, the opinion of Mr. Jefferson, with which I have been lately favoured: "We served together in congress, at Annapolis, during the winter of 1783 and 4: there I found him a very useful member, of an acute mind, attentive to business, and of an high degree of erudition."

In January, 1789, Doctor Williamson was married to Miss Maria Apthorpe, daughter of the late Honourable Charles Ward Apthorpe, formerly a member of his Majesty's Council, for the province of New-York: by that lady he had two sons: she died when the youngest was but a few days old.

After the loss he had sustained by the death of Mrs. Williamson, he resolved to retire from public employment; to settle his private affairs; to prepare for publication his work on Climate, and his more elaborate performance, his History of North Carolina: but the object of attention which lay still nearer his heart, and which especially induced him to withdraw from the very honourable station he had held, was the education of his children: to them he devoted, with great solicitude, a large portion of his time and attention. His eldest son, who died in 1811, in the 22d year of his age, gave evidence of the parental care that had been exercised in the superintendence of his education, and of the success with which it had been conducted. He was a good classical scholar—was well versed in astronomical and philosophical knowledge, and still more remarked for his correct deportment, his benevolence of character, and his sincere piety. He was an Alumnus of Columbia College, and reflected credit upon that institution, which holds so distinguished a place among the literary establishments of this country.

The younger son, whose constitutional infirmities gave little promise, by his death soon after, filled up the measure of his father's afflictions. Although the Doctor was never heard to lament the loss of his children, yet no fortitude of mind that he possessed could prevent him from feeling, that in the death of his elder son in particular, he had lost his companion, the staff and solace of his old age. But his mind did not require that repose which his feelings otherwise solicited. From this period, the pursuits of philosophy became the more exclusive objects of his regard.

In 1811, his "Observations on the climate in different parts of America, compared with the climate in corresponding parts of the other Continent," were published, in one volume 8vo. It is in vain to attempt any thing like an analysis of this performance, at this time: a few remarks, however, on this interesting subject, may not be irrelevant. Actuated by patriotism and the love of truth, Dr. Williamson indignantly exposes the sophistry of those writers who have asserted, that America is a country in which the frigid temperature and vice of the climate, prevent the growth and expansion of animal and vegetable nature, and cause man and beast to degenerate. He altogether discards the notion, that a new or inferior race of men had been created for the American continent. A firm believer in the Mosaic writings, he labours with the learned Bishop of Clogher to prove the conformity of things to biblical history. He believes our country, in her rivers, mountains, lakes, and vegetable productions, to be formed on a scale of more magnificence than those of the old world; and thinks that the winters are more temperate on the western than on the eastern coast of North America; although in some parts of this continent they are colder than in corresponding latitudes of Europe, he maintains a gradual amelioration of our climate. He considers the opinion that the Indian is of a new race, to be altogether untenable; that every part of America was inhabited when discovered by Columbus, and that North America was settled from Tartary or Japan, and from Norway; that South America was peopled from India.

While he admits the great antiquity of the globe, he, nevertheless, is the advocate of the comparatively recent origin of man: he concludes that the inhabitants of America, in the progress of time, may be expected to give proofs of genius, at least equal to those of the other continent. Mr. Jefferson, many years since, had successfully refuted the hypotheses of Buffon, with respect to the comparative size and number of animals, and the degeneration which was imputed to animal life in the new world. Dr. Williamson occupies more extensive ground, and, like his illustrious predecessor, armed with truth and philosophy, not only fully vindicates the animal and vegetable productions of this continent, but also the climate of America. The libellous assertions of Buffon, Raynal, Robertson, and a host of inferior writers, are put to nought by the facts and the conclusive reasonings adduced by Dr. Williamson.

In the following year, 1812, appeared his History of North Carolina, in two volumes 8vo.

The author commences his undertaking with a short account of the discoveries made in America by adventurers from the different parts of Europe. He next relates the attempts of Sir Walter Raleigh to settle a colony in North Carolina, and from that time the history of that colony is continued down to the beginning of the American Revolution: the work closes with a view of the soil, produce, and general state of health in different parts of that country. In the proofs and explanations annexed to each volume, are inserted many valuable documents, selected with care, illustrative of matters contained in the body of the text.

The materials of this work were derived chiefly from original sources, and, consequently, great dependence may be placed on them for their correctness. These materials too are the more to be valued, because little information could be obtained from any accounts of North Carolina, previously published. "Hackluyt, Purchas, and other early writers," says Dr. Williamson, in his preface, "have been sufficiently minute in describing the first discoveries, and the attempts that were made to form settlements on different parts of the continent; but no writer has treated with any attention of the progress of colonization, or the civil history of North Carolina, from the time in which the first permanent settlements were formed in that country. Wynn, Oldmixon, and others, who wrote of Carolina, have done little more than name the northern province; their attention was chiefly engaged by South Carolina." "My information," he continues, "has chiefly been taken from public records, and from letter-books or other manuscripts in the possession of ancient families."

In the general arrangement of his materials we find nothing to censure, and much to commend. The want of dates will occasionally be felt, as their more frequent occurrence must have been attended with additional advantage. In the selection of his matter, the Doctor has, with much propriety, enlarged upon circumstances of importance, without occupying the time of the reader with those which are of a trifling nature.

North Carolina is remarkable in affording, among many other memorable events, a more constant succession of grievances than fell to the lot of any other colony, and it presents throughout abundant room for philosophical inquiry and reflection. "I have confined myself," says the Doctor, "to this part of the history, although it was the less pleasing task."

The information contained in this work is communicated in a style remarkable for its uniform perspicuity and vigour. The narrative throughout affords numerous indications of more than ordinary penetration into the springs of human action. The author's reflections are the result of a ready and acute mode of thinking, divested of undue bias, and replete with good sense and salutary advice.

He who studies our colonial history, with the writings of Stith, Beverly, Colden, Belknap, Williams, Trumbull, Sullivan, Minot, and M'Call, must include the North Carolina of Dr. Williamson.*

There are other writings by the same author, of a minor nature, which merit notice. He was at no time an indifferent spectator of passing events; and even after he had actually withdrawn from public life, was repeatedly engaged, exclusively of his works on climate and on North Carolina, in various publications relating to natural history, medicine, and other branches of a philosophical character. In 1797, Dr. Williamson wrote a short but important paper† on the fevers of North Carolina, as they had prevailed in 1792, in Martin county, near the river Roanoke, and as they had appeared in 1794, upon the river Neus, pointing out the treatment that had been found most successful, and the fatal effects of blood-letting in fevers of that type: these remarks were afterwards extended, and composed a chapter in his History of North Carolina,* highly interesting both to the pupil and practitioner of medicine.

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* See Reviews of Dr. Williamson's work on Climate, and the History of North Carolina, in the American Medical and Philosophical Register, vol. III.

† See Medical Repository, vol. II. p. 156.

In the American Museum, by Mathew Carey, he published several fugitive pieces on languages and politics.

In his communication on the Fascination of Serpents, published in the Medical Repository,† he offers some new and ingenious opinions on that still inexplicable phenomenon in natural history.

Upon the appearance of the yellow fever in New-York, in 1805, Dr. Williamson was appointed by the corporation of the city, one of a Medical Committee to investigate the particular character and origin of the cases that occurred at the commencement of the pestilence of that season. From all that the Doctor had previously seen, as well as the facts that now fell under his view, he was led to the belief, with the other members of that committee, that the yellow fever is a disease sui generis, and consequently of a nature altogether different from the bilious remittent fever of this country.

He enriched the American Medical and Philosophical Register with several valuable papers. The first entitled, "Remarks upon the incorrect manner in which Iron Rods are sometimes set up for defending Houses from Lightning," &c. conveys some important practical instruction upon that subject.* His other papers were, "Conjectures respecting the Native Climate of Pestilence;" "Observations on Navigable Canals;" "Observations on the means of preserving the Commerce of New-York," and "Additional Observations on Navigable Canals;" all printed in the same periodical journal, under the signatures of *Observer*, or *Mercator.* Doctor Williamson was among the first of our citizens who entertained correct views as to the practicability of forming a canal to connect the waters of Lake Erie with the Hudson River; and the importance of this great work so engaged his feelings, that besides the papers already mentioned, on Canal Navigation, he published a series on the same subject, under the title of *Atticus.* These papers were so well received, that many thousand copies have been circulated through the medium of newspapers, and the pamphlet itself has been several times reprinted.

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* See vol. II.

† Vol. X. p. 341, &c

In the year 1810, Dr. Williamson was appointed by the New-York Historical Society, to deliver the anniversary discourse, illustrative of the objects of that Institution; he readily complied with their request, and upon that occasion selected for his subject, "the benefits of Civil History." That discourse is evidently the result of much reading and reflection.

Having noticed the general neglect among ancient nations, to preserve authentic records of their events, and the consequent uncertainty and incorrectness with which the occurrences of former times are related, even by the best ancient writers, the author dwells upon the pleasure and advantages which arise from the study of civil history, and points out its importance as a means of promoting human happiness.

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* Vol. I.

In 1814, associated with the present governor* of this state, and some other gentlemen friendly to the interests of science, and desirous to promote the literary reputation of the state of New-York, Dr. Williamson took an active part in the formation and establishment of the Literary and Philosophical Society of this city: and contributed to its advancement by the publication of a valuable paper in the first volume of its transactions.

As a Trustee of the College of Physicians and Surgeons, of the University of the State of New-York, he not only performed its duties with vigilance and impartiality, but contributed to its interests by a liberal pecuniary appropriation.

Some other institutions of this city were also aided by similar acts of his beneficence, especially the Orphan Asylum, and the Society for the Relief of Poor Widows with small children. To these his donations were such as his moderate fortune enabled him to bestow, consistently with his obligations to his family connexions; to whom, with the exception of a few inconsiderable legacies, he has left the residue of his estate.

The Humane Society, the City Dispensary, and the New-York Hospital, received a large portion of his time and attention during the remaining years of his life. In the last mentioned establishment, the punctuality and ability with which he performed the numerous duties assigned him, were subjects of great surprise to his associate junior members.

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* His Excellency De Witt Clinton.

His quickness of perception, his memory, his judgment, and his external senses, all manifested an uncommon activity to the very last days of his life. This exemption from the ordinary defects and privations attendant upon old age, is doubtless ascribable to his temperate and regular habits of living; the order and method with which he performed all his various duties: and especially to that rigid abstinence from all vinous and spiritous drinks, to which system of living he had so peculiarly adhered from his earliest days. For of him it may be truly said,

> " In his youth he never did apply
> Hot and rebellious liquors in his blood,
> Nor did not with unbashful forehead, woo
> The means of weakness and debility;
> Therefore his age was as a lusty winter,
> Frosty but kindly."—*As You like it.* Act II.

The life of this excellent man was now drawing to its close. Hitherto, by means of the uniform temperance and regularity of his habits, he had, with very few exceptions, been protected from any return of those pulmonary complaints with which he had been affected in his youth. His intellectual faculties remained to the last period of his life unbroken, and in their full vigour.

It is somewhere said, that to an active and well disciplined mind, a chair in a library is the throne of human felicity. No man enjoyed the luxury of literary pursuits more than Dr. Williamson. These, with the society of his particular friends, added to the consolations afforded by religion, and the recollection of a life passed in the performance of duty, and devoted to the benefit of his fellow-men, gilded the evening of his days, and rendered them no less cheerful and serene than had been the morning and meridian of his long and useful career.

For some time, however, after the death of his favourite son, his strength and spirits were observed to decline. In two or three years his ankles began to swell, attended with other symptoms denoting the approach of general dropsy. Although he had recourse to the Ballston chalybeate. by the middle of April, 1816, the swelling of the limbs and symptoms of a dropsical affection of the chest had so far increased, that for several weeks he could not lie in a horizontal posture, but was compelled to sleep sitting in his chair: by the use, however, of powerful diuretics, succeeded by tonic medicines and daily exercise, his complaints in a few months were chiefly removed, and he was restored to his usual pursuits, and his wonted cheerfulness, which were continued to the day of his decease.

This event took place on the 22d day of May last, in the 85th year of his age, and in the sudden manner he himself had anticipated. While taking his accustomed ride a short distance from the city, accompanied by his favourite niece,* to whom he was tenderly attached, the heat of the day being unusually great, he suddenly sunk into a deliquum. Medical assistance was immediately called, but too late: his spirit had fled to Him who gave it.

It remains for me to detain you, while I offer a few observations illustrative of such parts of Dr. Williamson's character as are not embraced in the details that have already occupied our attention.

To those who have not enjoyed a personal acquaintance with him, I may remark, that he was no less distinguished for the manliness of his form, than for the energy and firmness of his mind. Dr. Williamson, in his person, was tall, considerably above the general standard, of a large frame, well proportioned, but of a thin habit of body. He was remarkable for his erect, dignified carriage, which he retained even in the decline of life. His whole physiognomy was peculiar and striking. The proportion of his head to his person was good, and its configuration capacious and well-formed. The features of his face were strongly marked, and indicated bold and original thinking. His forehead was high, open, and boldly arched. His cheek-bones were elevated, exhibiting the characteristic of his Scottish ancestors. His eyes were of a dark gray colour; in their expression, penetrating and steady. His nose was long and aquiline. His mouth exhibited an unusual depression, which in advanced life was greatly increased by the loss of his teeth. His chin was long and remarkably prominent. These peculiarities diminished the beauty of a head, which, with those exceptions, was one of nature's finest models. Altogether, his form was one of those which cannot pass unnoticed; and if, in early life, he had sacrificed a little to the graces, his appearance would have been eminently attractive, as well as commanding.

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* Mrs. Hamilton, the wife of John C. Hamilton, Esq.

The portrait in your presence,* painted by an artist† whose works reflect lustre upon our country, and whose name is honoured by every production of his pencil, exhibits a faithful likeness of the original.

In his conversation, Dr. Williamson was pleasant, facetious, and animated; occasionally indulging in wit and satire; always remarkable for the strength of his expressions, and an emphatic manner of utterance, accompanied with a peculiarity of gesticulation, originally in part ascribable to the impulse of an active mind, but which early in life had become an established habit.

As was to be expected from the education of Dr. Williamson, and from his long and extensive intercourse with the world, his manners, though in some respects eccentric, were generally those of a polite, well bred gentleman. Occasionally, however, when he met with persons who either displayed great ignorance, want of moral character. or a disregard to religious truth, he expressed his feelings and opinions in such manner, as distinctly to show them they possessed no claim to his respect. To such, both his language and manner might be considered as abrupt, if not possessing a degree of what might be denominated Johnsonian rudeness.

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* The original portrait of Dr. Williamson, in the possession of the author of this memoir, was suspended in the College Hall, at the time this Discourse was pronounced.

† Colonel John Trumbull.

His style, both in conversation and in writing, was simple, concise, perspicuous, and remarkable for its strength; always displaying correctness of thought, and logical precision. In the order too and disposal of his discourse, whether real or written, such was the close connexion of its parts, and the dependence of one proposition upon that which preceded it, that it became easy to discern the influence of his early predilection for mathematical investigation. The same habit of analysis, arising from "the purifying influence of geometrical demonstration," led him to avoid that profusion of language, with which it has become the custom of some writers to dilute their thoughts: in like manner, he carefully abstained from that embroidery of words which a modern and vitiated taste has rendered too prevalent.

Under the impressions and precepts he had very early received, no circumstances could ever induce him to depart from that line of conduct which his understanding had informed him was correct. His constancy of character, the obstinacy I may say of his integrity, whether in the minor concerns of private life, or in the performance of his public duties, became proverbial with all who knew him. Nothing could ever induce him

"To swerve from truth, or change his constant mind."

As an illustration of his characteristic integrity, allow me to add, from the information of one of his friends, that when in congress, in 1791, it became his duty to vote upon the law passed in that year, imposing an excise on domestic distilled spirits, the celebrated whiskey law, as it was called, which gave rise to the western insurrection. In the debates on that subject, he took an active interest, and although he well knew that he was counteracting the sentiments of his constituents, he appeared the decided friend and advocate of that law.—On the day of its passing, and while the people were going from the hall, Dr. Williamson overtook a friend, from whom I received this anecdote: the Doctor joined him, informed him of the passage of the bill, and added in his usual sententious manner, "Sir, my vote was in its favour; I have discharged my duty to my conscience, but I have lost my popularity. I shall never again be elected to congress:" but that gave him no uneasiness: believing it to be a right measure, he had voted as his conscience and his best judgment dictated, and, as he observed, "he was not without the hope that one of its effects would be to lessen the use of a poison which was destructive of the morals and health of a numerous class of the people."* I beg leave to add another evidence, which fell under my own notice, of that rigid adherence to moral rectitude which ever marked his character.

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* See Remarks by Dr. Williamson, on the increasing consumption of spirituous liquors in the United States, and the evil they produce to society.—*History of North Carolina*, vol. II.

A few years since, a gentleman of this city, desirous of borrowing a sum of money, made an application to Doctor Williamson for that purpose: the Doctor promised to supply him; but upon the day when the transaction was to be completed, the gentleman not knowing that the Doctor's verbal promise and his written bond were of the same validity, and apprehending that something might occur to prevent the Doctor from complying with his engagement, offered him a larger interest than that recognised by law. The Doctor, offended by this insult to his integrity, at once declined further communication with the party concerned, and refused the loan he otherwise had been prepared to make.

Upon another more important occasion, he manifested somewhat similar feelings in rejecting a powerful appeal to his pride, and, I may add, to his reputation.

Joseph Ceracchi, an Italian statuary of great celebrity in his profession, finding the turbulent state of Europe unfavourable to the exercise of his art, had come to this country. This gentleman exercised his talents in erecting honorary memorials of some of our most distinguished public men. The busts of Washington, President Adams, Governor Jay, General Hamilton, Governor George Clinton, and Colonel John Trumbull, are eminent examples of his art.

He, at that time also, as appears by a correspondence in my possession, applied to Dr. Williamson, then a member of congress, for permission to perpetuate in marble, the bust of the *American Cato*, as Mr. Ceracchi was pleased to denominate him. I beg leave to read the originals:

"Mr. Ceracchi requests the favour of Mr. Williamson to sit for his bust, not on account of getting Mr. Williamson's influence in favour of the National Monument; this is a subject too worthy to be recommended; but merely on account of his distinguished character—that will produce honour to the artist, and may give to posterity the expressive features of the American Cato."

To this note, Dr. Williamson replied in his appropriate caustic style:

"Mr. Hugh Williamson is much obliged to Mr. Ceracchi for the polite offer of taking his bust. Mr. Williamson could not possibly suppose that Mr. Ceracchi had offered such a compliment by way of a bribe; for the man in his public station who could accept of a bribe, or betray his trust, ought never to have his likeness made, except from a block of *wood*.

"Mr. Williamson, in the mean time, cannot avail himself of Mr. Ceracchi's services, as he believes that posterity will not be solicitous to know what were the features of his face. He hopes, nevertheless, for the sake of his children, that posterity will do him the justice to believe, that his conduct was upright, and that he was uniformly influenced by a regard to the happiness of his fellow-citizens. and those who shall come after them."

"Philadelphia, 11th April, 1792."

To those who knew his unbending resolution when once formed, it need not be added, that Dr. Williamson, offended by this flattery, persisted in his determination not to sit to Mr. Ceracchi.

The steadiness of his private attachments ought not to be passed over in silence. Dr. Williamson was slow in forming his friendship; but when formed, as the writer of this memorial of his worth can testify, it was immoveable, and not to be changed by time or distance.

Whatever may be the merits of Dr. Williamson, as a scholar, a physician, a statesman, or philosopher; however he may be distinguished for his integrity, his benevolence, and those virtues which enter into the moral character of man; he presents to the world claims of a still higher order. The lovers of truth and virtue will admire much more than his literary endowments, that regard for religious duty, of which, under all circumstances and in all situations, he exhibited so eminent an example.

There are some philosophers, and of great attainments too in their particular departments of knowledge, whose views are so riveted to, I had almost said identified with, the objects of their research, that they cannot extend their vision beyond the little spot of earth which they inhabit. Dr. Williamson was not an associate of this class: with all his inquiries into the physical constitution of this globe, like Newton and Rittenhouse, he could elevate his views to the Great Agent that gave existence to our world, and sustains it in its connexions with the other parts of the universe.

To those who delight to dwell on themes like these, it will be gratifying to receive the expression of his own sentiments and feelings on this momentous subject. In a letter I possess, written during his last illness, while it displays the full possession of his mental faculties, and manifests the consciousness of his approaching dissolution, and his patient resignation to that event; he observes, "I have not any apprehension of a long confinement by sickness; men of my habits usually drop off quickly; therefore I count it my duty to be constantly in a state of preparation, whether I may be called off in the morning, at noon, or at midnight."

Upon another occasion, a short time before his decease, he thus concludes a letter to his nephew, and which, I believe, proved one of his last communications.

"I have, as I believe, given you notice of every thing to which it is proper that you should attend; and having now, as I think, nearly finished my course through the wilderness of life, grant, O Lord! that when my feet shall touch the cold stream of the waters of Jordan, my eyes may be steadily fixed on the heavenly Canaan, so that I may say to death, 'where is thy sting?'"

Such was the man whose character and services we have this day endeavoured to commemorate.

Citizens of America,

If piety, patriotism, talents, and learning, and these all devoted to his country's good and the best interests of mankind, entitle their possessor to praise and gratitude, you will cherish with respect the memory of Hugh Williamson, whose name will be associated with those to whom we are most indebted for our country's independence, and the first successful administration of that happy constitution of government which we now enjoy.

Young Gentlemen,

You who are now engaged in the pursuits of science as preparatory to the exercise of a liberal profession, will also learn, from the example that has been exhibited, to set a due value upon the diligent and profitable employment of your time, to dedicate your talents and services to your country's welfare; and above all, to cherish that love of truth, virtue, and religion, for which the venerable subject of this imperfect eulogy was so eminently distinguished.

NOTES.

No. I.

Extract from a Letter of the Right Reverend Bishop White, Pennsylvania, to Dr. Hosack, New-York.

PHILADELPHIA, October 14, 1819.

DEAR SIR,

ON the receipt of your letter of the 12th, I called on my neighbour, Mr. Read, whose information on the subject of your inquiry is as follows:

Dr. Williamson had learned that the letters of Governor Hutchinson were deposited in an office, different from that in which they ought regularly to have been. There had been some business which had convinced him (Dr. W.) that, in the transactions of the former office, there was no great exactness. He repaired to it, and not finding the principal within, he addressed himself to the chief clerk: assuming the demeanour of official importance, he demanded the late letters of Governor Hutchinson; noticing the office in which they ought properly to be placed. Mr. Read thinks it was that of the Secretary of State, but is not sure. The letters were delivered. Mr. Williamson carried them to a gentleman who would deliver them to Dr. Franklin, and the next day set off for Holland. Mr. Read remarked, that his statement should be taken in connexion with the narrative to be found in the Life of Dr. Franklin.

I have no doubt of the correctness of the communication of Mr. Read. Independently of the character he has sustained through life, and to a great age, Dr. W. and he were born within twelve miles of each other, and were companions from their boyhood.

Very respectfully your very humble servant,

WILLIAM WHITE.

To Dr. D. Hosack.

P. S.—The Mr. Read mentioned in this letter, is brother to the late George Read, Esquire, of New-Castle, Member of the First Congress, and since Senator for Delaware, under the Federal Government. W. W.

No. II.

Extract from a Letter of James Read, Esq. to Dr. Hosack.

Philadelphia, October 26, 1819.

Sir,

The enclosed contains all the additional information I have been able to collect, relative to the subject of your letter, dated on the 20th instant.

As to the Hutchinson letters which I mentioned to Bishop White, I well remember Dr. Williamson telling me, some time after his return from Europe, that he was the person who had procured them; having gotten information as to the office in which they were, (I think he said it was a particular part of the Treasury,) he went there, and without hesitation said to a clerk, (the only person then in the office,) that he came for the last letters that had been received from Hutchinson and Oliver, from Boston; that the clerk, without asking a question, gave him the letters, which he put into his pocket and walked out. He was convinced the clerk supposed him to be an authorized person from some other public office; that he placed the letters in a proper situation to be conveyed to Dr. Franklin, then in London, and he departed immediately for Holland. This is, if not exactly, at least the substance of what the Doctor told me, in a conversation we had on the then situation of our public affairs. The effects resulting from that transaction are generally known.

It will afford me much gratification, if any thing contained herein should be deemed useful to you in portraying the character of the estimable, and truly respectable, Dr. Williamson.

I am, with respect,
Sir,
Your obedient servant,
Dr. D. Hosack. JAMES READ.

No. III.

Extract from a Letter from the Honourable John Adams, LL. D. late President of the United States, to Dr. Hosack.

Quincey, January 28, 1820.

Sir,

Your Biographical Memoir of Dr. Williamson, which I have read with great interest and satisfaction, has excited so many reminiscences, as the French call them, that I know not where to begin, or where to end.

My first acquaintance with Dr. Williamson, was in Boston, in 1773, when he made a strong impression upon me, and gave me a high opinion of the intelligence, as well as energy of his character. He gave us great comfort, at that time, by the representation he gave us of the ardour of the people in the American cause, in the middle and Southern States, especially in New-York and Philadelphia. I was afterwards more particularly acquainted with him, when he was a member of the House of Representatives, in Congress; when he communicated many things to me, particularly that he was descended from Sir William Wallace, the great Scottish hero, patriot, and martyr. He informed me also, that he was employed in writing the History of North Carolina, a work that I have long wished to see, but have never been so fortunate as to obtain.

I was one of the first persons to whom Mr. Cushing communicated the great bundle of letters of Hutchinson and Oliver, which had been transmitted to him, as Speaker of the House of Representatives, by Dr. Franklin, their agent in London. I was permitted to carry them with me upon a circuit of our Judicial Court, and to communicate them to the chosen few. They excited no surprise, excepting at the miracle of their acquisition. How that could have been performed nobody could conjecture; none doubted their authenticity, for the hand-writing was full proof: and, besides, all the leading men in opposition to the ministry, had long been fully convinced that the writers were guilty of such malignant representation, and that those representations had suggested to the ministry their nefarious projects. I doubt not the veracity of Dr. Williamson's account of the agency in procuring those letters, but I believe he has omitted one circumstance, to wit, that he was employed upon that occasion by Mr. Temple, afterwards Sir John Temple, who told me, in Holland, that he had communicated those letters to Dr. Franklin. Though I swear to you, said he, that I did not procure them in the manner represented. This I believe, and I believe further, that he did not deliver them with his own hand, into Dr. Franklin's, but employed a member of Parliament, very possibly Mr. Hartley, for that purpose; for Dr. Franklin declared publicly that he received them from a member of Parliament.

I am,
Your obliged friend, and most
Humble servant,
JOHN ADAMS.

To D. Hosack, M. D. LL. D.

To the foregoing statement it may be proper to add, that Captain John Williamson, a surviving brother of the deceased, in a conversation which I held with him shortly after the death of Dr. Williamson, fully confirmed the above account of his brother's agency in procuring the letters of Hutchinson. He moreover declared, that his information had been derived immediately from his brother. D. H.

AN

INAUGURAL ADDRESS,

DELIVERED BEFORE

THE NEW-YORK HISTORICAL SOCIETY,

ON THE

Second Tuesday of February, 1820.

No. VIII.

INAUGURAL ADDRESS.

Gentlemen,

Members of the New-York Historical Society.

While I acknowledge with gratitude the honourable distinction you have conferred upon me, I beg leave to assure you, that I accept this station, and enter upon its duties, with great humility. To this, the mind cannot be insensible, that appreciates the objects for which this institution was founded; the high respectability which it has attained under the auspices of those who have hitherto presided; and the duties which remain to be performed, in the fulfilment of the high expectations which the patronage of the state, and the liberal contributions of the friends of this association, have justly excited.

Allow me, for a moment, to mingle my feelings with yours, in calling your attention to the important services which have been rendered to the Institution, by those who have preceded me in this chair, and to acknowledge the obligations which they have imposed on their fellow-members, and upon the community.

The honourable Egbert Benson, the first President of the New-York Historical Society, may be justly regarded as its father and founder. While he presided over its destinies, and conducted it through the stages of its infancy, his exertions were unremitting, and his benefactions liberal. To found and organize an association like our own, is always a task accompanied by many obstacles; but to perpetuate its existence, to unite the zealous and active exertions of its members, requires the incessant anxiety and attentions of its patrons. Some content themselves with the gratification of giving origin to a society, and then abandon it to the rude sport of neglect and accident; it belongs to enlightened, ardent, and vigorous minds, to conduct it along through paths of difficulty, until it secures a permanent and elevated character. Posterity will unite their gratitude with ours, for the unwearied efforts, and the laudable example, displayed in the official conduct of our first President.

Under the presidency of that accomplished scholar and eminent statesman, the late Gouverneur Morris, this Society also received a great accession to its fame and usefulness, not only by the lustre of his talents, the elevated character which he sustained in the republic, and the public services which he had rendered at home and abroad, but by the constant devotion of his time to the interests and honour of his native land. His public discourses and communications, in which he was ever obedient to your call, will remain among the lasting literary monuments of the nation, and his name will find a place on the brightest page of her history. His family, since his decease, have not been unmindful of that attachment which he ever cherished and expressed in behalf of this Institution. By their liberality, and for which they deserve the warmest acknowledgments of gratitude, some of the most valuable coins and medals of his cabinet, besides other contributions, have been presented to this society.

I also consider it due to justice to notice the liberal exertions of my distinguished predecessor in office, His Excellency Dewitt Clinton, in behalf of this institution. To him we are largely indebted for much of its present prosperity. In his legislative capacity, he exerted his influence in promoting its interests, and eventually succeeded in obtaining the passage of the law, containing a grant of twelve thousand dollars. His agency in obtaining this donation was conspicuous. In addition to his literary labours, which the Society will ever appreciate with pride and satisfaction, his contributions have been numerous and valuable: and, allow me to add, that upon declining a re-election, he requested that the Society might be assured of his warm and unremitting attachment to its welfare and reputation. The deep interest which he has invariably manifested in elevating the character of his native state, in the promotion of education, in the diffusion of science and literature; the unremitting exertions and efficiency he has displayed in the establishment of internal improvements; are conclusive evidences, in addition to the benefits we have received from his agency, of his zeal for knowledge, and of his devotion to the best interests of his country.

But, gentlemen, while we thus do homage to those who have filled the highest stations in this Society, we cannot be insensible to the great debt of gratitude which is due to another member of this association.* I need not here recount his long-continued and disinterested services. While the bond that unites us exists, they must continue to be recollected with grateful emotions. Nor have his exertions been confined to this Institution alone: they have been extended to most of the literary and benevolent associations which have recently exalted the character of our city. Those services can never be forgotten—they will live in the recollection of a grateful community, and will be the frequent theme of future eulogy.

To promote the object of this Institution, is the duty of every individual member, but especially of those who are invested with its honours.

I trust I shall not make an unreasonable demand upon your patience, if I make use of the present occasion to call your attention to some objects which, although they have fallen within the views of our Institution, have not been regarded in a manner correspondent to their importance.

The library of this Society particularly claims our notice. A classification of the numerous and valuable works of which it is composed, so as to render them more easy of research, appears to be much wanted; and it is essential, that the great mass of *Tracts* and *Pamphlets* should be assorted, bound, and have a place in the catalogue. It cannot be expected, that the gentleman* who holds the station of Librarian, can conveniently, with his numerous other avocations, devote the time that may be required for this duty. You will, perhaps, think it expedient to add to the standing committee of the Society, or to institute a distinct library committee to assist in these arrangements, as well as to afford their counsel in whatever may appertain to the augmentation and direction of that department.

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* John Pintard, LL. D.

To obtain every work connected with American history and literature becomes daily more important, as the United States rise in the estimation of the world. Our national character is becoming more elevated—our resources more the object of admiration—and our political institutions a subject of remark and speculation in every civilized nation of the globe. Hence, the incidents of our early history—the struggles which we passed through in the incipient stages of national existence, and the virtues which we displayed in scenes of trial and suffering, will constitute a theme of anxious inquiry. To supply, by every possible means, the works necessary to complete our colonial history, therefore, demands our earnest exertions. Never should our researches cease or become languid, until every thing is accomplished within the bounds of industry and munificence, to supply the deficiencies of this department. It should also be a great consideration to preserve whatever may illustrate the national, civil, literary, medical, and ecclesiastical history of our country. Already our legislative acts, and judicial decisions, and, I believe, almost every historical treatise, are deposited in our library. These constitute the basis upon which every future historian must erect his structure; but it must be strikingly apparent, that in the infancy of our literature, newspapers, magazines, and pamphlets, are frequently the only printed evidences of public transactions; and although they are too often the organs of faction, and the vehicles of private malignity and disappointed ambition, they are the depositories of valuable knowledge, and form a partial commentary on the passing events of the day. Our collections, in this respect, are already highly respectable; and I beg leave to suggest the expediency of adopting such measures as may ensure to us every journal, magazine, review, and every other publication in this state. I would recommend an application to the proper authorities, in laudable imitation of the practice of Great Britain to her celebrated Museum, and of France to her Academy, to secure us a copy of every work printed in the state, to be placed on the shelves of our library. Although, individually, many such productions are fugitive and comparatively insignificant; still, collectively, they contribute to show "the form and pressure of the times," and serve to convey to posterity the literary character, the prejudices, the passions, and even the follies of the age.

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* The Rev. Mr. Schaeffer.

The cabinet of coins and medals, in consequence of the recent liberal donations from the heirs of the Rev. Dr. Kunze, deceased, in connexion with the contributions of the members of the Society, and the additions received from other sources, has attained a very respectable eminence, and is, probably, at this time, equal in value to any other collection in the United States. At this early period of our national existence, it is pre-eminently important to procure and preserve, as opportunities may offer, every medal that commemorates great public occurrences, in military and naval achievements. Never should we forget, that the recollection of momentous and illustrious events in the annals of mankind—exalted instances of valour and fortitude—and brilliant acts of individual prowess and virtue, have found their way to after generations, through this imperishable channel. These types and emblems of glory, have survived the ravages of time and revolution, and brought to light facts of interest and magnitude in the chain of history, when the states and empires in which they were struck, have slumbered in the dust for ages, and the mausoleum and the triumphal column lost their form, grace, and beauty. It is to be regretted that this subject excites so little consideration in the infancy of our Republic, when every thing touching our national fame is so keenly and universally felt. The march of nations is before us, and the gloomy night of darkness and ignorance that obscures their paths, to the eyes of posterity, may one day envelope our own, however bright the sun of civilization may now beam upon us. If we would hold up the mirror of history, let us not forget our duty to ourselves, as well as to other times.

A committee on coins and medals having been some time since appointed to complete the arrangement, and to prepare a catalogue of the cabinet, it is presumed this duty has been performed, or is nearly accomplished, especially as such catalogue will form an important item in the next volume of our Collections.

Your Hall, gentlemen, is ornamented with a portrait of the founder of this cabinet, and you have designated the collection by his name—yet more is required; and allow me to express the desire we all cherish, that a biographical memoir of that learned professor and divine, be prepared under the auspices of this Society.*

Connected with this subject, I suggest for your consideration, how far it may conduce to the accomplishment of one of the objects of this Society, to increase the number of the *portraits* of the eminent men of our country, particularly of the first settlers of this state, and the founders of the republic.

By such means we shall be able to give additional aid to the Fine Arts; they deserve, and should receive, more of our encouragement and support. It also occurs to me, that it may be productive of benefit to this Society, to appoint a committee for the express purpose of soliciting and collecting copies of American engravings, as well to illustrate our national history by the portraits of its heroes, its public characters, important events, and the scenery of our country; as to preserve and perpetuate specimens of the *graphic art*, which, though of modern introduction in the United States, has attained a degree of excellence that is little inferior to that of the old world.

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* The Rev. Mr. Schaeffer, has been appointed to perform that duty.

The Society has been singularly fortunate in the nature and extent of its *manuscript* collection of facts and documents relative to the war of our revolution—some papers on that era of our national character remain yet to be gathered.

The recent war declared by Congress in 1812, has afforded several historical works of unequal merit. Besides these compends, and others more extensive if they exist, it is the duty of the Historical Society of this State, to procure, as far as it is practicable, every original document on this subject. New-York was, in an especial manner, the scene of action; some of the most momentous events occurred in this state, and we owe it to ourselves to possess at least a portion of the original materials for the future historian.

Another subject deserves the attention of our Society. Considering the eventful age in which we live, and the extraordinary characters to which it has given birth, but few authentic biographies have been put on record. While the events in which distinguished men have participated are fresh in the recollection, and the anecdotes of their lives are familiar to their contemporaries, great opportunities are afforded for correct portraits of character. Already has negligence in our own state suffered many interesting incidents in the lives of her early heroes, statesmen, and philosophers, to sink into oblivion. Indeed, while we allow these services and merits to remain unrecorded, we have little right to complain that foreign nations have done us injustice. No refutation of their calumnies can prove more effectual, than a fair exhibition of the virtues and talents of our illustrious men.

Among those who have served the state, with their commanding talents, but without any monument of our gratitude, the late Lieutenant Governor Cadwallader D. Colden; the late Vice-President, the venerable George Clinton; the late Samuel Jones, and the Right Rev. Bishop Provost, have the highest pretensions to consideration. Although the first has secured to himself the permanent remembrance of posterity, by his invaluable history of the Five Nations, his correspondence with Dr. Franklin, and his medical disquisitions, yet no one has traced his various services to the Commonwealth, during an administration distinguished for important events, and scenes of danger and responsibility. The civil and military career of the late George Clinton holds forth a noble and fertile subject for the pen of genius and eulogy. His sagacity, his valour, his fortitude, and more than all, his stern unbending integrity, offer an example worthy to be retained in the temple of Fame, among the models of ancient virtue. Whoever shall trace his acts in the cabinet and in the field, and draw the faithful picture of his character, will expand the lustre of a great name, contribute to the celebrity of the state, and to the honour of the nation. When such a man arises on the theatre of public life, it is to guide and to save; and if there be talent or power to perpetuate the memory of his deeds, a proud and enlightened people should never slumber over an apathy that is daily consigning them to neglect.

I rely on the testimony of others, when I speak of the eminent legal talents of the late Samuel Jones: common consent has indeed assigned him the highest attainments in jurisprudence, and the appellation of the Father of the New-York Bar. He justly ranked among the most profound and enlightened jurists of this or any other country, and acted a useful and conspicuous part in organizing our courts and judiciary system, in this state, after the close of the revolution. His industry, his purity of character, and his extensive acquirements, present an inspiring example to the young candidate for future renown. It is also to be earnestly hoped, that the evidence of the varied learning and elegant literature of the late Bishop Provost, whose life embraces much of the early history of the church, will not rest on the oral testimony of his contemporaries: but that some gentleman of congenial feelings and pursuits may be selected, who will assume the task of making them known to posterity.

The Cabinet of Natural History belonging to this Society was first established in 1816. At that time no other public institution existed in this city, for the collection and classification of the objects of this department of knowledge, or for obtaining the mineralogical and other natural productions of the United States. Since that period, the Lyceum of Natural History has been organized; and; under the auspices of its learned and efficient

President,* supported by the zeal of its young and active members, has acquired character and reputation, and promises to be eminently useful in the cultivation of this branch of science.

Under these circumstances, it merits our consideration, how far the benefit that was contemplated by the Historical Society, in the erection of this department of Natural History, will not be more essentially and completely accomplished by the Lyceum; and whether the proposed transfer of the Cabinet will not prevent collision in our labour, and by concentrating the objects in view, promote the interests of science, and advance the respectability of the New-York Institution?†

I feel it my duty here to suggest the propriety of instituting a gold or silver medal for the best topographical and statistical account of the different counties of the state. In the memoirs of the Connecticut Academy of Arts and Sciences, there are accounts of several counties in that state, particularly one, by that late learned and distinguished theologian and scholar, Dr. Dwight; and I cannot deem it unbecoming the dignity of our society, to imitate the meritorious example of our eastern brethren. If, however, contrary to all expectation, this suggestion should prove unsuccessful, through the opposition of the ignorant, or the evil-minded, for the *Bohon Upas* is not exclusively the product of Java, vigorous exertions to the same purpose should not be spared to obtain the aid and co-operation of active members in different sections of the state. Every thing touching the power and resources of any section of the immense empire on this side of the Atlantic, over which millions of freemen are diffusing civilization, arts, and refinement—every thing calculated to reveal moral and physical strength, is eminently entitled to attention. It gives confidence, and imparts enterprise at home; it inspires admiration, and commands respect in foreign countries.

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* Dr. Samuel L. Mitchill.

† Since the delivery of this Address, the object here suggested has been carried into operation.

The settlement of the western counties of this state is so recent, that many of the original settlers are still living, from whom may be easily procured every fact of importance. The state of New-York was once the residence of a tribe of Indians, by far the most distinguished of any who have been known on this continent. Their manners, their history, and above all, the monuments of art which they have left behind them, invite the attention of all those who delight to contemplate the native. moral, and intellectual character of our species. The most enlightened nations have, by direct effort, encouraged such inquiries.

The statistical views of Scotland and of Ireland. have been read or heard of by us all: the late Emperor of France had nearly completed a survey of his dominions on a gigantic scale, and the English nation are now in the successful prosecution of a similar design.

The publication of a third volume of the collections of this Society, appears to be loudly demanded. It is with some pain that I observe, that this

Institution has existed upwards of sixteen years, and that only two volumes of its transactions and papers have appeared, whilst the Historical Society of Massachusetts, in little more than the same period of time has published no less than sixteen volumes.*

This deficiency on our part, cannot have arisen from lack of materials, but from the want of patronage, for our shelves abound in rare printed tracts, and in manuscripts of great value. If every member of this Society would enter into an obligation to purchase a copy of each volume of its transactions as it may appear, the price of which would be amply remunerated by the value of its contents, the Society would be enabled, by this security alone, to publish an annual volume of its papers and communications.

This measure would not only be the means of preserving important documents from oblivion, but at the same time would direct that attention to the history of our own country, which is now in a great degree devoted to that of modern Europe, or to a classical and critical acquaintance with that of Greece and Rome.

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* Since this address was delivered, a third volume of its papers has been published, and materials for a fourth are in a state of forwardness.

SYLLABUS

OF THE

COURSE OF LECTURES

ON

BOTANY,

Delivered in Columbia College in 1795.

At a meeting of the Trustees of Columbia College, held at the College Hall, on Monday the ninth of July, 1792:

Ordered, That every Professor of this College who teaches by Lecture, do publish within one year, a Syllabus of his Course of Lectures.

Extract from the Minutes,
ROBERT HARPUR, Clerk.

No. IX.

SYLLABUS, &c.*

PART I.

STRUCTURE AND FUNCTIONS OF VEGETABLES.

A.

GENERAL DIVISION OF NATURAL HISTORY.

1 METEOROLOGY	History of the	ATMOSPHERE,	
2 HYDROGRAPHY		WATERS,	
3 GEOLOGY		EARTH,	
4 ZOOLOGY		ANIMAL	kingdoms.
5 BOTANY		VEGETABLE	
6 MINEROLOGY		MINERAL	

—Division of bodies into *animal—vegetable*, and *mineral*, considered—objections to—

Opinions of *Tournefort*, *Linnæus*, &c. examined.—

Minerals—characters which distinguish them from animals and vegetables—

Vegetables—their near approach to the animal kingdom—

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* The present Syllabus of the Course of Lectures on Botany, delivered for a series of years in Columbia College, while the author held the professorship of botany in that institution, is here inserted. It is republished from the copy drawn up and printed in 1795.

Distinctions proposed by

JUNGIUS,
BOERHAAVE,
TOURNEFORT,
LUDWIG,
LINNÆUS,
ALSTON,
HEDWIG, &C.

Corals and *Zoophytes*, referred by some authors to the vegetable and fossil kingdoms—their *animal* nature illustrated by the discoveries of *Peysonnel*, *Trembley*, *Jussieau*, *Donati*, *Ellis*, *&c.*—

B.

COMPARISON OF PLANTS AND ANIMALS.

1 Their origin
2 Growth and manner of receiving nourishment.
3 Food.
4 Climate.
5 Secretion and excretion.
6 Sensation--volition—motion—sleep—watching.
7 Sexes.
8 Propagation.
9 Diseases.
10 Death.
11 Natural decomposition.
12 Chemical Analysis.

CONCLUSION—Animals and Vegetables, links of the same chain of being—objections to, by some Metaphysicians, considered.

C.

GENERAL ARRANGEMENT OF VEGETABLES.

1 Palms.
2 Trees.
3 Shrubs.
4 Herbs.
5 Grasses.
6 Ferns.
7 Fungi.
8 Mosses.
9 Algæ.

—Characters of each illustrated.—

D.

COMPONENT PARTS OF A PLANT.

1 Root
2 Trunk.
3 Branches.
4 Leaves.
5 Supports.
6 Flower.
7 Fruit.

—Exceptions to.—

E.

ANATOMY OF PLANTS.

A.—SOLIDS.

1 Epidermis.
2 Rete Mucosum.
3 Cortex—its inner layer LIBER—
4 Alburnum.

6 Medulla.
7 Vasa Propria.
8 Tracheæ, or air vessels—have no existence—

—Structure and functions of plants illustrated by dissection and experiment.—

B.—FLUIDS.

(a.)—NUTRITIOUS FLUIDS.

1 Lymph.
2 Sap.

—Circulation of the sap disproved—doctrine of the Ancients——experiments of HALES, HOPE, WALKER, &c.

(b)—SECRETED FLUIDS.

1 Gums.
2 Resins.
3 Gum Resins.
4 Balsams.
5 Oils—fixed and volatile.
6 Aroma—grateful and poisonous.
7 Water.
8 Vital air.

C.—ANOMALOUS SUBSTANCES.

1 Saline Substances.
  i Sugar,
  ii Manna,
  iii Nectar,
2 Farina,
3 Fœcula,
4 Colouring Matter.

—Observations on colours, and the principles of dyeing.—

F.

CHEMICAL ANALYSIS OF VEGETABLES.

1 Oxygen,	Common to all vegetables.
2 Hydrogen,	
3 Carbon,	
4 Nitrogen,	Contained in particular vegetables.
5 Phosphorus,	
6 Sulphur,	
7 Acids,	
8 Alkalis,	
9 Earths,	
10 Metals,	

G.

FOOD OF PLANTS.

1 Air,
2 Water,
3 Earth,
4 Heat,
5 Light.

—All necessary to the perfect growth of plants—illustrated by experiments and observations.—

—Experiments of VAN HELMONT,
BOYLE,
HALES,
DU HAMEL,
TILLET,
HASSENFRATZ,
SENEBIER, &c.—

—Chemical Analysis of the *food* of plants compared with the Chemical Analysis of *plants*.—

H.

SOILS.

1 Variety.
2 Composition.
3 Manner of Operation.

I.

MANURES.

1 Animal.
2 Vegetable.
3 Mineral.
4 Electricity.

—Operation of Manures—how far useful or injurious.—

K.

OF THE SEED.

A.—DIFFERENT KINDS.

1 Seed, properly so called.
2 Nux.
3 Propago.

B.—COMPONENT PARTS OF THE SEED.

1 Arillus.
2 Hilum.
3 Foramen.
4 Cotyledon.
5 Corculum.
  i Plumula.
  ii Radicula.

6 Corona.
7 Ala.

—Structure and Functions of each illustrated by dissection and experiments—

D.—VEGETATION OF THE SEED.

1 Impregnation,
2 Air,
3 Moisture,
4 Heat,
5 Light, } Not essential to the first
6 Earth, } growth of the seed.

} Necessary to Vegetation.

—Experiments of CURTIS, &c.—process of Vegetation described.

D.—PROPAGATION.

(a)—NATURAL PROPAGATION.

1 Seeds.
2 Roots.
3 Suckers.
4 Stems.
5 Bulbs.
6 Leaves.

(b)—ARTIFICIAL PROPAGATION.

1 Cuttings.
2 Layers.
3 Engrafting.
4 Inoculation.

—Structure of Buds—

—Equivocal generation, objections to.—

L.

OF THE ROOT.

A.—DIFFERENCE OF STRUCTURE AND SHAPE.

1 Bulbous.
2 Tuberous.
3 Fibrous.

B.—MANNER OF GROWTH.

1 Creeping.
2 Horizontal.
3 Perpendicular.

C.—DURATION.

1 Annual.
2 Biennial.
3 Perennial.

—Exceptions from Culture, Climate, &c.—

M.

OF THE TRUNK.

A.—DIFFERENT KINDS.

1 Caulis.
2 Culmus.
3 Scapus.
4 Frons.
5 Stipes.

B —DIFFERENT SPECIES ARISING FROM—

1 Structure.
2 Height.

3 Direction.
4 Shape.
5 Surface.
6 Composition.
7 Branches.
8 Colour.

—Illustration.—

N.

OF THE LEAVES.

A.—COMPONENT PARTS OF A LEAF.

(a)—FOLIUM.

1 Its base.
2 Apex.
3 Surfaces.
4 Parenchyma.

(b)—PETIOLUS.

1 Its shape.
2 Length.
3 Insertion.
4 Direction.
5 Surface.

B.—SIMPLE LEAVES.

1 Place of insertion.
2 Manner of insertion.
3 Relative situation.
4 Direction.
5 Shape.
6 Surface.

7 Length and expansion.
8 Substance.
9 Duration.

C.—COMPOUND LEAVES.

—Degree of composition.

—Illustration.—

D.—FUNCTIONS OF LEAVES.

1. Use in the vegetable economy as organs of respiration.
2 Influence upon the atmosphere.
Experiments of MILLER,
HALES,
MARIOTTE,
BONNET,
DU HAMEL,
PRIESTLEY,
INGENHOUSZ,
SENEBIER.

O

FULCRA, OR MORE PROPERLY, *APPENDAGES*.

1 Stipulæ.
2 Bracteæ.
3 Cirrhus.
4 Spini.
5 Aculei.
6 Pili.
7 Glandula.

—Illustration.—

P

ORGANS OF FRUCTIFICATION.

A.—PEDUNCULUS.

1 Its composition.
2 Place of insertion.
3 Relative situation.
4 Direction.
5 Structure.

B.—RECEPTACULUM.

1 Its composition.
2 Surface.

C.—CALYX.

1 Perianthium.
2 Involucrum.
3 Gluma.
4 Spatha.
5 Calyptra.
6 Volva.

—Characters of each.—

1 Shape.
2 Number.
3 Divisions.
4 Number of pieces.
5 Situation.
6 Colour.
7 Duration.

D.—COROLLA.

1 Its shape.
2 Regularity.
3 Divisions.
4 Number of pieces.
5 Place of insertion.
6 Colour.
7 Duration.

E.—STAMINA.

(a)—FILAMENTUM.

1 Its length.
2 Proportion.
3 Figure.
4 Number.
5 Connexion.
6 Insertion.

(b)—ANTHERA.

1 Shape.
2 Number.
3 Disposition.
4 Structure.
5 Pollen.

E.—PISTILLUM.

(a)—GERMEN.

1 Its situation.
2 Structure.

(b)—STYLUS.

1 Shape.
2 Number.

3 Division.
4 Length.
5 Direction.

(c)—STIGMA.

1 Shape.
2 Number.

Sexes of plants—imperfectly known to the ancients—demonstrated by Linnæus—

Experiments of LINNÆUS,
SMITH, &c.

Objections of—ALSTON—
—SMELLIE—
—SPALLANZANI—considered—.

G.—PERICARPIUM.

1 Capsula.
2 Conceptaculum.
3 Siliqua.
4 Legumen.
5 Drupa.
6 Pomum.
7 Bacca.
8 Strobilus.—

H.—SEED.

—(*See* K. *Page*, 234.)

Q.

INFLORESCENCE.

1 Spadix.
2 Verticillus.
3 Capitulum.
4 Spica.
5 Panicula.
6 Amentum.
7 Racemus.
8 Fasciculus.
9 Umbella.
10 Cyma.
11 Corymbus.
12 Thyrsus.

—Illustration.—

—Calendarium Floræ, &c. &c.

PART II.

SYSTEMATIC ARRANGEMENT OF VEGETABLES.

A.

HISTORY OF BOTANY.

FIRST PERIOD.

I. STATE OF BOTANY AMONG THE GRECIANS.

Hippocrates,	400 years	A. C.
Theophrastus—"Historia Plantarum,"—500 plants	320	A. C.

II. STATE OF BOTANY AMONG THE ROMANS.

Dioscorides—600 plants—	70	P. C.
Pliny—Compilation—1000 plants—	74	
Galen—	131	

—Destruction of the Roman Empire—
—Decline of Learning until the eighth century—
—Learning revived by the Arabians.—

III. STATE OF BOTANY AMONG THE ARABIANS.

Translations and compilations from the Grecian and Roman writings—
—Decline of Learning until the fifteenth century—

SECOND PERIOD.

—Age of Commentators and Translators,	1500
Brunfelsius—first accurate prints of plants	1532
First public Botanic Garden at Padua,	1533

CONRAD GESNER—first Museum in Natural History—first suggested a systematic arrangement of plants into class—order—genus, and species,	1560
CÆSALPINUS—improved the proposed classification of Gesner,	1583
F. Columna—first copperplates—improved the genera of plants, and Botanic language	1592
J. Bauhin, "Historia Plantarum Universalis,"	1613
Caspar Bauhin, "Pinax Theatri Botanici," 6000 plants—with synonymes of the ancients,	1628
Parkinson—"Theatrum Botanicum,"	1640
JUNGIUS—"Doxosopiæ Physicæ Minores," containing the first principles of Linnæan classification,	1657
Societies for promoting knowledge.	
Royal Society of London,	1665
Royal Academy of Sciences at Paris	1666
Grew—"Anatomy of Plants,"	1671
Malpighius—"Anatomia Plantarum,	1675
Rheede—"Hortus Malabaricus,"	1676
MORISON—"Historia Universalis Plantarum"—a new system of arrangement,	1678
RAY—"Methodus Plantarum Nova Synoptica,"	1682
"Historia Plantarum Generalis,"	1686
"Synopsis Methodi Stirpium Britannicarum,"	1690
HERMAN, New System—"Flora Lugduno Batava,"	1690
RIVINUS, New System.	1690

Plumier—“Description des plantes de L’Amerique,”	1693
Sir Hans Sloane—“Natural History of Jamaica,”	1696
TOURNEFORT—New System—improved the genera—	1697
Kœmpfer—“Amœnitates Exoticæ.”	1712
Scheuchzer—Agrostagraphia,	1719
BOERHAAVE—New System,	1720
MAGNOL—New System,	1720
Hales—“Vegetable Statics,”	1727
Micheli—Cryptogamia,	1729
Catesby—“Natural History of Carolina,” &c.	1731

THIRD PERIOD.

LINNÆUS—Sexual System—	
“Fundamenta Botanica,”	1735
“Species Plantarum,” 1764.	
“Genera Plantarum,” new edition by Schreber, 1789.	
“Systema Vegetabilium,” 14th edition by Murray, 1784.	
“Systema Vegetabilium,” by Gmelin, in his “Systema Na ra Linnæi,” 1791.	
“Philosophia Botanica.”	
“Amœnitates Academicæ,” new edition, by Schreber, 1787.	
“Flora Lapponica,” new edition, by Smith, 1792.	
“Prælectiones in Ordines Naturales,” by Giseke. 1792, &c. &c.	

Dillenius—"Historia Muscorum,"	1741
Rumphius—"Herbarium Amboinense,"	1741
Haller—"Stirpes Helveticæ."	1742
Ludwig—"Institutiones Regni Vegetabilis,"	1742
Clayton—"Flora Virginica,"	1742
Gmelin—"Flora Siberica,"	1747
Alston—"Tyrocinium Botanicum,"	1753
Bonnet—"Recherches sur l'usage des feuilles,"	1758
Du Hamel—"Physique des Arbres."	
BERNARD DE JUSSIEAU—"Genera Plantarum secundum ordines naturales disposita,"	1759
Do. new edition by Paulus Usteri, 1791.	
Hudson—"Flora Anglica,"	1762
Adanson—"Familles des Plantes,"	1763
Sir Joseph Banks, Dr. Solander,	1763
Jacquin—"Historia Stirpium Americanarum,"	1763
"Hortus Vindebonensis," 1770.	
"Flora Austriaca," 1773.	
Flora Danica.	1766
Schreber—"History of Grasses,"	1769
SIR JOHN HILL—"Vegetable system," new system,	1773
Aublet—"Guiana,"	1776

Curtis—"Flora Londinensis, "Observations on Grasses," 1790. "Botanical Magazine," 1793. "Observations on vegetation," &c.	1777
Lightfoot—"Flora Scotica,"	1778
LA MARCK—"Flore Françoise"—new system—	1778
Hedwig—"Cryptogamia,"	1782
Pallas—"Flora Rossica,"	1784
L'Heretier—"Geraniologia"—"Sertum Anglicum,"	1784
Thunberg—"Flora Japponica,"	1784
Marshall—"Arbustrum Americanum,"	1785
Dickson—"Cryptogamia," &c. &c. &c.	1785
Walther—"Flora Caroliniana,"	1788
GÆERTNER—"De Fructibus et Seminibus plantarum."—New System,	1788
Smith—"Reliquæ Rudbeckianæ," "Icones Plantarum hactenus ineditæ," 1789. "Icones Pictæ Plantarum Rariorum," 1790. "Spicilegium Botanicum," 1791. "Botany of New Holland," 1793, &c.	1789
English Botany,	1790
Woodville—"Medical Botany,"	1790
Transactions of the Linnæan Society of London,	1791
Martyn—"Flora Rustica,"—"Language of Botany," &c. &c. &c.	1793

B.

LINNEAN ARRANGEMENT.

A.—ARTIFICIAL, OR SEXUAL SYSTEM.

—Divided into—

1 Classes.
2 Orders.
3 Genera.
4 Species.
5 Varieties.

—Characters of each.—

(a)—CLASSES FORMED FROM

1 The number,	Of the Stamina.
2 Place of insertion,	
3 Proportion,	
4 Connexion,	
5 Disposition, &c.	

—Illustration.—

(b)—ORDERS FORMED FROM

1 The number,	Of the Pistilla.
2 Fertility,	
3 Situation,	
4 Structure of the Pericarpium.	
5 Number,	Of the Stamina.
6 Connexion,	
7 Disposition, &c.	

—Illustration.—

(c.)—GENERA FORMED FROM THE ORGANS OF FRUCTIFICATION.

(d)—SPECIES FORMED FROM

1 The Root.
2 Trunk.
3 Branches.
4 Leaves.
5 Fulcra, &c.

(e.)—VARIETIES—THE EFFECTS OF CLIMATE, CULTURE, &C.

—Illustration.—

—Alterations of the Linnæan System, proposed by Thunberg—Gmelin, &c.—

B.—NATURAL ORDERS OF LINNÆUS.

—Illustration.—

C.

SYSTEM OF JUSSIEAU.

—Compared with the natural orders of Linnæus.— —Advantages of each.—

D.

—Plants useful in Diet—Medicine—Agriculture, &c. illustrated with practical observations.—

E.

—Herbarium—advantages of—manner of preserving and arranging plants.—

—CONCLUSION.—

OBSERVATIONS ON THE LAWS
WHICH GOVERN THE
COMMUNICATION
OF
CONTAGIOUS DISEASES.

COMMUNICATED IN A

Letter to Dr. Colin Chisholm of Clifton, England ;
dated New-York July 16, 1808.

No. X.

OBSERVATIONS, &c.

Dear Sir,

Agreeably to my promise in a former communication, I shall now state to you the result of my observations on contagion, a subject which has created so much dispute in the medical world, and which divides our profession in the western as well as in the eastern hemisphere. As far as I have examined this subject, it appears to me to be more a dispute about words than facts. The abuse of the terms *contagion* and *infection*, and the neglect of writers in not annexing to them a precise definition of the manner in which they severally employ them, have, I believe, been the source of our medical warfare relative to the contagiousness of yellow fever, and some other diseases: *e. g.* the greater number of medical writers enumerate, in the list of contagious diseases, all those which are in any way communicable from one person to another, whether by *contact*, *fomites*, *atmosphere*, *&c.* without designating the *circumstances* attending these several modes of communication.

Lind, in his papers on contagion and infection, (which he considers as synonymous terms,) is guilty of this error, in which he has been followed by most writers upon the subject of fever, &c. The late Dr. R. Bayley, in his account of the yellow fever which prevailed in New-York in 1795, proposed a distinction between *contagious* and *infectious* diseases. He made use of the first term to denote such as are communicated under any circumstances of atmosphere, whether pure or impure, as small-pox, measles, &c. *Infectious* diseases he denominated those which are communicated in consequence of an impure or vitiated state of the atmosphere; *i. e.* that the *impurities* of the atmosphere communicate the disease, not that the air contains any *specific material* derived from the patient, except such as may be occasioned by the want of cleanliness. This distinction, proposed by Dr. Bayley, is, in my opinion, an approach nearer the truth than any of his predecessors have advanced, but it does not present us with a view of the *whole truth* upon the subject. The visitor or attendant contracts disease from one of *two sources*, either from the filth of the sick room, or from a *specific something* issuing from the body of the sick, the consequence of the peculiar disease under which he labours. If a person visiting another ill of the *yellow fever* or *plague*, derive his disease from the *impure atmosphere* of the apartment, I ask how it happens, that in all instances he contracts the *same disease* with that of the person whom he visits? Why is his disorder not an *intermittent*, a *remittent*, *jail fever*, or *dysentery*, which are considered the usual produce of filth? If he derive any thing specific from the sick, his disease is then assuredly not to be considered as occasioned by the *atmosphere*, but depending on the *peculiar condition of the fluids*, or state of the system, induced by the action of a specific poison; in other words, it is to be considered a *contagious* disease. The distinction proposed by Dr. Bayley, inasmuch as it does not account for the communication of the *peculiar form* of fever or disease which is thus propagated, I therefore consider to be insufficient to account for the circumstances attending the communication of those diseases to which it is applied. That I may not be misunderstood, I will suppose A to be ill of *dysentery*, a disease well known to be attended with a *peculiar train of symptoms*; he is in a small confined apartment, his person is neglected, the atmosphere around him is rendered impure and offensive: under these circumstances B visits him, and a few days after is also taken sick with the *same disease*, attended in all respects with the *same* dangerous symptoms which characterize the disorder of A. Dr. Bayley, and those who adopt the doctrine of *infection* as opposed to *contagion*, consider the disease of B to proceed from the *impurities of the chamber*, and not from any thing *peculiar* emanating or secreted from the body of A. But as we may, without hazard, visit an equally filthy chamber where C lies ill of *cholera morbus*, or D with a *broken limb*, I therefore ascribe the disease of B to something more than the *impure air* of the chamber of A. I ascribe it to a *peculiar virus* generated in his system by the disease under which he labours, and communicated by his excretions to the surrounding atmosphere, rendering it thus capable of producing the same disease in those who may be exposed to its influence.

The communication of this virus from the sick to the well, in whatever form it may be conveyed, as uniformly produces the *same disease* as *inoculation* excites the *small-pox*, *vaccination* conveys the *vaccine virus*. So far, then, there is something in *common* in the communication of contagious or infectious diseases, which should be accordingly expressed in the language we employ—some of those diseases are conveyed in one form, others in a different: we should then be equally careful to mark those circumstances in which they *differ*, as well as those which they possess in common.

Such an arrangement appears to me not only practicable, but, at the same time, calculated, in some degree, to harmonize the differences of opinion which now separate the contagionists and non-contagionists. Under these impressions, I propose to arrange those diseases which are communicable from one to another under three heads. First, those which are communicated *exclusively* by *contact*. In this class I enumerate

The Itch,
Syphilis,
The Laanda of Africa,
Frambœsia, or Yaws,
Elephantiasis, or Leprosy,
Hydrophobia, and
The Vaccine virus.

Neither of these diseases can be communicated in any other way than by *contact*; they are, therefore, *contagious* diseases, in the strict etymological sense of the term. It is also to be remarked, that these diseases are never conveyed through the medium of the *atmosphere;* actual contact alone can communicate them from one person to another.

These diseases, acknowledged by all to be contagious, and so denominated by all writers, have a law of communication peculiar to themselves. But there is a second class of diseases also considered as contagious, which are communicated under different circumstances, governed, in this respect, by different laws of communication.

Those to which I now allude are such as are communicated both by *contact* and by the *atmosphere.* In this class I arrange

Small-pox,
Measles,
Chicken-pox,
Hooping cough,
Scarlet fever, and
Cynanche maligna.

Contact, or the *close approach* to the sick, labouring under these diseases, will communicate them to those who are susceptible of their influence—but they are no less communicable through the *medium of the atmosphere.* A *second law,* which governs the communication of this class of contagious diseases, is, that they are communicable in *every season,* in the heat of *summer,* as well as in the cold of *winter*—in a *pure* as well as in an *impure* air, though more readily by the latter than the former. A *third law* of communication in this class of diseases, is, that the persons afflicted with them are not generally susceptible of a second attack. I say *generally*, because exceptions are related upon very respectable authority.

This second class of contagious diseases is, therefore, abundantly distinguished from the first; but they are still associated by most medical writers under the same head of contagious diseases, without assigning to each class its discriminating characters.

The same want of discrimination has, in my opinion, occasioned the numerous disputes among physicians relative to the contagiousness and non-contagiousness of those fevers which I enumerate as the *third class* of diseases that are communicable from one person to another. Under this head I arrange

Plague,
Yellow fever,
Typhus, *Jail*, *Ship*, *Hospital*, *or Lake fever*, and
Dysentery.

These diseases are only, in general, communicable through the medium of an *impure* atmosphere: in a pure air, in large and well ventilated apartments, when the dress of the patient is frequently changed, all excrementitious discharges immediately removed, and attention paid to cleanliness in general, these diseases are not communicated, or very rarely so, from one to another. But in an *impure* air, rendered so by the decomposition of animal and vegetable substances, as takes place in low marshy countries, or by concentrated human effluvia, as in camps, jails, hospitals, or on shipboard, they are rendered not only extremely malignant and mortal in themselves, but become communicable to others who approach the sick, or breathe the same atmosphere, which has become *assimilated* to the poison introduced, insomuch that *the same specific disease* is communicated, whether it be the *plague*, *yellow fever*, *typhus*, or *dysentery*.

Hence we account for the fact stated by Sydenham and other writers on epidemics, that the prevailing disease swallows up all other disorders, *i. e.* that during the prevalence of an epidemic plague, typhus, dysentery, or other diseases of this class. every indisposition of a febrile sort readily assumes the character of the prevailing disorder. We know this to be experienced in the diseases of other countries, and we see it daily exemplified in our own: both in our cities and in the country towns, when, after heavy showers of rain, and the action of a hot sun, a decomposition of vegetable and animal substances takes place, and dysentery or typhus fever is produced, it assimilates the air to itself, whatever may be the acting poison. But under other circumstances of weather and season, the disease thus originating from some local circumstances, or from a peculiar habit of body in the person so affected, does not extend beyond the family in which it first occurred, or, perhaps, the individual in whom it originated.

This class of diseases, therefore, like the former, has a law peculiar to itself; *i. e.* the diseases composing it are communicable, or, otherwise, depending upon the *condition of atmosphere* in which they occur or are introduced—whereas those of the second class are conveyed from person to person, through a *pure* as well as an *impure* medium but they also are rendered more virulent and malignant in an atmosphere charged with miasmata. than in that which is free from such ingredients.

It is also, I believe, generally true of the diseases of the *third class*, not perhaps excepting the *plague* and *yellow fever*, that they may be taken a *second time*. This has been advanced by the advocates for the domestic origin of yellow fever, as an argument against the contagiousness of this disease.

But, upon the same principle, they must deny the contagiousness of all those disorders which I have enumerated in the *first* class, as *itch*, *syphilis*, *&c.* for most of them are also to be taken a second time; yet they are acknowledged by all to be *contagious diseases.* In the same manner, many persons make the *small-pox* a standard, and conclude that yellow fever is not contagious, because it is not communicated under the same circumstances of atmosphere and season, and governed by the same laws with that disease.

They might with the same propriety conclude, that the *scarlet fever* is not contagious, because it is not attended with the pustules of small-pox. This teaches us the importance of correct language to convey the several degrees of contagion which have been noticed: and that, while we may make use of the terms now in use, we should annex to them such explanations as will convey those different laws of communication which have been enumerated. With those precautions in the use of the language we employ, I believe, the contagionists and non-contagionists will find themselves very much in the situation of those theologians of whom Pascal speaks, and ready to adopt the expression of one of them, when he observes, "La difference qui est entre nous est si subtile, qu'à peine pouvons mous la marquer nous memes."

We would then be ready to admit, that the yellow fever is a contagious or communicable disease, in an *impure* atmosphere; but not generally so where the air is preserved pure and free from noxious materials. This doctrine, too, I believe, will better account for the apparently contradictory facts, which have been urged by the advocates of the two opposing opinions, than any system that has been adopted.

It will also lead to a system of police regulations, which will best ensure us against the ravages of yellow fever when introduced; at the same time it will teach us carefully to guard against the introduction of it from abroad.

I shall treat this subject more at length upon another occasion, in connexion with the evidences of the importation of the yellow fever into the United States.

I am,
With sentiments of high respect,
Yours,
DAVID HOSACK.

Dr. Chisholm.

ADDITIONAL OBSERVATIONS

ON

THE LAWS WHICH GOVERN THE COMMUNICATION

OF

CONTAGIOUS DISEASES;

AND

THE MEANS OF ARRESTING THEIR PROGRESS.

READ BEFORE THE

Literary and Philosophical Society of New-York,

June 9, 1814.

The following Observations on Contagion were originally drawn up in June, 1812, in a letter addressed to Dr. Chisholm, and were intended as an answer to his strictures on my proposed classification of contagious diseases: the substance of that communication to Dr. Chisholm has, in every respect, been preserved entire, though, for obvious reasons, in the paper as now printed the epistolary form is laid aside.

No. XI.

OBSERVATIONS, &c.

In July, 1808, I addressed to Dr. Chisholm some observations on contagion, or infection.* The object of that communication was, if possible, to narrow the ground of controversy upon that important and much contested subject. This I endeavoured to do, first, by showing that the distinction which had been proposed by some late writers, between contagion and infection, was unnecessary and fallacious; secondly, by dividing all diseases which are contagious, infectious, or communicable from one person to another, into different classes, according to the several laws which appear to govern their communication. These classes are three in number.

The first embracing those diseases which are communicated exclusively by contact; as the *itch*, *syphilis*, *hydrophobia*, &c. which are never conveyed through the medium of the atmosphere.

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* See Edinburgh Med. and Surg. Journal, vol. V. p. 247. American Medical and Philosophical Register, vol. II. p. 14.

The second including those diseases which are communicable both by contact, or the near approach to the sick, and by the atmosphere, as *measles*, *small-pox*, *scarlet fever*, &c. which are communicable in every season of the year, and in every climate; in a pure as well as in an impure air, though more readily by means of the latter than the former, and with which persons are rarely infected more than once in their lives.

Under the third class are enumerated those diseases which are only, in general, communicable or contagious through the medium of an impure atmosphere; the air being rendered thus impure by the decomposition of animal and vegetable substances, as in low, marshy countries; or by concentrated human effluvia, as in camps, jails, hospitals, or on shipboard; but the same diseases I alleged, in a pure air, in large and well ventilated apartments, when the dress of the patient is frequently changed, all excrementitious discharges constantly removed, and attention paid to cleanliness in general, are not usually contagious, or, under such circumstances, are very rarely communicated from one person to another.

In this class I included the *plague*, *dysentery*, *typhus fever*, in its various forms, of jail, ship, hospital, or lake fever, and the *yellow fever*.

I also remarked, that these diseases, like many of the first class, may be repeatedly contracted; but that they are communicable, or otherwise, according to the condition of the air in which they occur, or into which they may be introduced: it was further observed, that the atmosphere thus impregnated by the peculiar virus emanating from the diseased body, becomes assimilated to the poison, or ferment introduced, and thereby is rendered capable of reproducing in others the same specific disease, whether it be the plague, dysentery, typhus, or yellow fever. Such are the outlines of my first communication to Dr. Chisholm.*

In 1809, Dr. Chisholm did me the honour to reply† to the foregoing observations, expressing his entire approbation of the two first classes, but objecting to the third. After enumerating his several objections, he requests me to re-consider my third division, which appears to him to be the only objectionable one. This I have done, and now submit the result of a further examination of this subject, and a detail of the facts by which I have been led to my conclusion relating to the laws of communication which I have more particularly assigned to the febrile diseases enumerated in the third class.

Waiving for the present all inquiry relative to the nature or properties of the contagious principles secreted by the diseased body, or the chemical qualities of the atmosphere deemed necessary for its propagation, or the manner in which the contagion diffuses itself, I proceed to observe, that the history of each disease enumerated in the third class, viz. *plague*, *dysentery*, *typhus*, in all its forms, and *yellow fever*, furnishes evidence of the correctness of the remark, that they are governed by a law peculiar to themselves, that they are contagious or communicable in a foul atmosphere, but that they are never or very rarely so in a pure air, where the sick enjoy the benefits of cleanliness and ventilation.

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* See p. 251.

† See American Medical and Philosophical Register, vol. II. p. 121 See Note A.

The same evidence I trust, will demonstrate another truth, that these diseases are, in no instances, epidemic, as they have been improperly denominated by most practical writers, but that their sphere of operation is, with very few exceptions, confined within the limits to which the vitiated atmosphere extends, in which they may be engendered, or into which they may be introduced: and that, in this respect, they differ from ordinary epidemics, "which appear in different and distant parts of the same place, and at the same time."

That the plague when once generated, whatever may be the sources whence it derives its origin, is communicated by a peculiar virus secreted by the diseased body, will not, I trust, be questioned at this day. Independently of the facts contained in the writings of Thucydides, Lucretius, Mead, Dr. Patrick Russell, and others, showing the contagious nature of the plague, the communication of this disease by inoculation, as performed by Mathias Deggio,* Dr. Whyte,† and the Russian surgeon, noticed by Sonnini,‡ have recently established the fact of its propagation by a specific secretion, beyond all possible controversy.

It has been observed by Assalini, that Dr. Desgenettes, while in Syria, had in vain endeavoured to inoculate himself with the virus of the plague: and by the same writer it is incorrectly added, that Dr. Desgenettes made the experiment under the persuasion that the disease was not contagious: but from the account of the facts as stated by Dr. Desgenettes himself, it appears that the experiment was not made under that persuasion. On the contrary, he expressly declares, that its contagiousness was demonstrated by "a *thousand examples*," and observes, contrary to the opinion of many, that the same person was liable to a second attack of it, as was the case with the convalescents whom he employed to attend upon the sick: furthermore it appears, from his own account, that he inoculated himself with the matter taken from a person who had the disease in its mildest form, what he denominates the first degree; in which the fever was slight, and the patient easily and promptly cured. Dr. Desgenettes adds, that it was an imperfect experiment, and that it does not disprove the communication of the disease by contagion, and that he made the experiment for the purpose of quieting the fears of the French troops and of inspiring them with confidence.*

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* See Med. Com. vol. VIII. p. 349.

† See Wilsons's expedition to Egypt, and M'Gregor's Sketches.

‡ See Travels into Greece and Turkey, p. 497.

But that the plague, in common with the other diseases I have associated with it, is only communicable through the medium of an impure or vitiated atmosphere, is an opinion which, although it has never been attended to by physicians, will be found to be verified by every writer on this disease.

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* See note B.

1st. The plague of Athens, the first of which we have any authentic or satisfactory account, furnishes evidence of the truth. Whether that disease originated in the city of Athens, or was introduced into it from Æthiopia, the fact is established, that the circumstances under which it appeared in that city were peculiarly favourable to its diffusion. It appeared, according to Thucydides, in the beginning of the summer season, and first of all at the Piræus, the port and harbour of Athens, from whence it spread with increasing mortality into the upper part of the city. It appeared, too, at a time when Athens was so crowded with those who had fled thither from the adjacent country of Attica for safety from the invading armies of the Peloponnesians and their allies, that many of them were forced to lodge themselves within the turrets of the walls, or wherever they could find a vacant corner. "The city," says the historian, "was not able to receive so large a conflux of people:" "afterwards the long walls, and a great part of the Piræus, were portioned out to them for little dwellings; at the same time, too, the Athenians were fitting out, at the Piræus, a fleet of one hundred ships to infest Peloponnesus." Even the Pelasgic, a hitherto vacant spot of ground below the citadel, which it was thought profaneness to occupy, and the settlement of which the Pythian oracle had specially prohibited, they were constrained, by urgent necessity, to turn into a dwelling-place. By this influx from the neighbourhood of Athens its number of inhabitants, as stated by a late writer, was suddenly increased from fifty thousand to more than four hundred thousand persons.* In another place, Thucydides observes, "Those who had come in from the country had no houses, but dwelled all the summer season in booths, where there was scarcely room to breathe;" he adds, "The pestilence destroyed with the utmost disorder, so that they lay together in heaps, the dying upon the dead, and the dead upon the dying." Even in the public streets, some where tumbling one over another, or lay expiring round about every fountain, whither they had crept to assuage their immoderate thirst: the temples, too, in which they had erected tents for their reception, were full of the bodies of those who had expired there. Thucydides proceeds, "In a calamity so outrageously violent, things sacred and holy had quite lost their distinction; all regulations observed before in matters of sepulture were quite confounded, since every one buried wherever he could find a place." He also observes, "it raged the most, and for the longest time, in Athens, but afterwards spread into the other towns, especially in the most populous, but never extended itself to Peloponnesus." We are told by the same historian, that "at the siege of Potidæa, which took place during the same season, the plague followed them even thither, and, making grievous havoc among the Athenians, destroyed the army; and that even those soldiers that had been there before, and had from the beginning of the siege, been in perfect health, caught the infection from the troops, brought thither by Agnon. After a stay of forty days, having, in that time, lost one thousand and fifty out of four thousand men, he returned with his ships to Athens."*

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* Medical Repository, vol. I. p. 16.

With these facts before us, the season of the year in which the plague made its first appearance, the part of the city in which it commenced, the multitudes which crowded into it, and those, too, unaccustomed to the air of the town, having been habituated to active employment in the pure air of the country, the impure state of the atmosphere necessarily resulting from this condition of things, combining the evils both of pestilence and war; the disease itself being confined within the walls of the city, while, at the same time, it never extended itself to the neighbouring country, not even to the contiguous towns of Peloponnesus and Bœotia, we are led to the conclusion, at least to the strongest presumptive evidence that an impure atmosphere is the vehicle or medium by which this disease is propagated.

2d. The circumstances attendant upon the plague, as it has appeared at different periods in the city of Rome, are no less demonstrative of this truth. I will only notice the more remarkable visitation of this disease which took place in the year of Rome 290, and four hundred and sixty-one years before Christ. "This," says Livy, "was a season of great distress; for during this year a pestilential disorder spread itself not only through the city, but over the country, affecting both men and cattle with equal malignity; the violence of the disorder was increased by admitting into the city the cattle and the inhabitants of the country, who fled thither for shelter from the enemy's ravages: such a confused collection of animals of every kind suffocated the citizens by the unusual stench, while the country people, crowded together in narrow apartments, suffered no less from the heat, the want of rest, and their attendance on each other; besides even contact served to propagate the infection."[*] Baker's Livy.

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* Smith's Translation of Thucydides, vol. I. p. 153.

Dionysius of Halicarnassus mentions[†] that the disease seized studs of mares, herds of oxen, and flocks of goats and sheep, doubtless denoting that this disease was remarkably fatal to those animals when collected in numerous bodies. Orosius, in his account of the same pestilence, observes, "Many of the patricians were victims, but it was most fatal to the poor."[‡] Livy also has a similar observation, that many illustrious persons died, but that among those of inferior note the virulence of the disorder spread its ravages wide.

3d. The history of the pestilence of modern times, the accounts of which are more minutely and satisfactorily detailed, no less proves that this disease, when once introduced, spreads its devastation by means of a vitiated atmosphere, more especially where such vitiation proceeds from confined human effluvia. *Erasmus* in 1515, in a letter to Franciscus (Wolsey's physician) ascribes plague, and the sweating sickness, partly to the incommodious form and bad exposition of the houses, to the filthiness of the street and the sluttishness within doors. "The floors, he writes, are commonly of clay, strewed with rushes, under which lies unmolested an ancient collection of beer, grease, fragments, bones, spittle, excrements of dogs and cats, and every thing that is nasty," &c.* Diemerbroek also remarks in his excellent treatise on the plague, that whenever that disease has been introduced out of its proper season it has not spread. It has also been observed by Dr. Russel, that in winter time when infected persons have come to places about Aleppo, some of whom have died of the disease in families where they lodged, the distemper was not propagated. Dr. Hodges also stated that those who fled from London, in the autumn of 1665, during the ravages of the plague, and returned in winter time, to the houses and beds in which their friends died of the malady, escaped the infection. It therefore depends both upon temperature, and the condition of atmosphere for its propagation.

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[*] Grave tempus et forte annus pestilens erat urbi, agrisque, nec hominibus magis, quam pecori; et auxere vim morbi tenore populationis. pecoribus agrestibusque, in urbem acceptis. Ea colluvio mixtorum omnis generis animantium, et odore insolito urbanos et agrestem confertum in arcta tecta, æstu ac vigillis angebat, ministeriaque in vicem ac contagio ipsa vulgabant morbos. Tit. Liv. lib. 3. c. 6.

[†] Lib. 10.

[‡] Lib. 2.

It is likewise an unquestionable fact, says the writer of the article *Plague*, (see Rees) that, this disease has always first appeared, and established its head quarters in the filthiest parts of crowded, ill constructed, and large cities, and has committed its most fatal ravages among the lowest of the people. Thus at Grand Cairo and Constantinople, it appears almost annually.

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* Life of Erasmus by Laycey. Lond. 1805.

In London, Dr. Heberden observes that the plague of 1626 and 1636, broke out at White-Chapel, a part of the town which abounds with the poor and with slaughter houses. In the plague of London, in 1665, at which time nearly one hundred thousand persons perished, it is stated to have broken out first at St. Giles's. We are also told by Hodges, that while the better sort of people had various resources to avoid the dreadful consequences of this fatal distemper, it was entirely confined to the poor, insomuch that some gave it the name of the *poor's plague.*

The rich, says Mr. Howard, are less liable to the plague than the poor, both because they are more careful to avoid infection and have larger and more airy apartments, and because they are more cleanly, and live on better food, with plenty of vegetables; and this I suppose is the reason why protestants are less liable to this distemper than catholics during their time of fasting; and likewise, why the generality of Europeans are less liable to it than Greeks and particularly Jews. He adds, I have heard of instances of servants in European families, who, through imprudence and carelessness, have been attacked with the plague. while the rest of the family escaped it.*

We are told by Diemerbroek, that it was a common practice in Italy and France, when the plague appeared in any large town, to drive out the poor immediately: so fully were the magistrates convinced that the disease was preserved and propagated by them. Upon the same principle, at the commencement of the plague at Marseilles, all beggars were ordered to quit the town.* "Indeed," says Dr. Blane, "it is a general remark in the history of all plagues, both in Asia and Europe, that they break out and prevail only among the lowest and poorest ranks of people, never becoming epidemic among the better sort."† When the plague was last in England, upon its first entrance into Poole, in Dorsetshire, the magistrates immediately suppressed it by removing the sick into pest houses without the town.‡

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* Account of Lazarettos, p. 52

Lord Clarendon, in the history of his own life, relates, that when he and other people of condition, who had fled from the plague, returned to London, they hardly missed one of their friends or acquaintances, the mortality having been confined almost entirely to the lowest orders of the people. "At that time too, the streets of London," says Thornton, "were narrow, crooked, and incommodious, the buildings chiefly of wood, dark, close, and ill contrived, and by the several stories projecting beyond each other as they rose over the narrow streets, the circulation of the air was almost entirely obstructed, to these inconveniencies, he adds, may in some measure be attributed the destruction which had been repeatedly made in the city by the visitation of the plague; for as the air was confined, so the noisome vapours and pestilential atoms were harboured and nourished. Though the destruction of London by the great fire in the succeeding year (1666) occasioned great temporary distress, yet, in the end, it proved of the utmost utility; for, by the rebuilding of the city, and the enlargement of the streets, the free circulation of air was admitted, the offensive vapours expelled, and the city freed from all pestilential disorders."* It is also stated by Dr. Hodges,† that at the breaking out of this plague, the city was unusually full of people: he supposes that there must have been upwards of one hundred thousand persons more than usual in the city; and according to Dr. Baynard, during the progress of this merciless pestilence, there was such a general calm and serenity of weather as if both wind and rain had been expelled the kingdom, and that for many weeks together not the least breath of wind could be discovered.

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* Ferriar's Med. Hist. and Reflect. vol. I. p. 287.

† Diseases of Seamen, 3d ed. p. 622.

‡ Robertson's Med. Police. vol. II. p. 149.

It is also worthy of remark, that the city of Oxford, to which the parliament was removed during the prevalence of this disease, remained uninfected; which exemption is ascribed, by Dr. Plott, to the draining and greater cleanliness of that city.‡

4th. The great plague with which Marseilles was visited in 1720, and which destroyed upwards of sixty thousand of its inhabitants, presents us with a detail of facts which leads to the same conclusion. Blackmore takes notice, that the impurity and filth connected with the galleys and slaves, at Marseilles, filled the air with offensive smells, and in 1720 the plague broke out there in a part of the town thronged by the poorest people. This disease, it is well ascertained, was introduced from the Levant by a ship which arrived at Marseilles from the coast of Syria. It appeared first among the sailors of the suspected ship; it was next taken by the porters engaged in opening and airing the merchandise in the Lazaretto; it was then introduced into the city, and spread among the poor, and first of all in a street which was only occupied by the lower class of people.*

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* Thornton's History of London. † De Peste.

‡ History of Oxfordshire.

In the commencement of the disease, Bertrand remarks, none but children and poor persons were attacked by it.† In a short time it extended to the neighbouring streets: it was also conveyed into the Hotel Dieu, by a person received as a patient from the street where the distemper first broke out; two of the nurses and the matron of that institution first died of the disease, when the infection spread with great mortality, destroying the physicians,‡ surgeons, apothecaries, confessors, and all the other officers and servants of the house. with the whole of the poor in the hospital, including above three hundred foundlings.§

Soon after, all intercourse was prohibited between the town and neighbouring country; the scarcity of provisions which ensued, independently of the crowded state of the city, greatly added to the mortality of the disease: the number of the sick increasing, an hospital was opened for the reception of the infected, where the disease proved fatal to all the attendants. But the disease was not only propagated in those public institutions, where great numbers were crowded together, and in the confined dwellings of the poor; other circumstances occurred which served greatly to diffuse the poison still more generally throughout the city. According to Bertrand, the streets were crowded with " the sick, the dying, and the dead," and the vapours which arose from the putrid dead bodies, in every part of the city, served to infect the air and spread the contagion; indeed, it soon extended to places that before this had been inaccessible to it; monasteries, and houses shut up in the most exact manner, were no longer places of security; the whole city became more or less *one infirmary.**

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* Bertrand's Relation Historique, p. 414. † Bertrand, p. 50.

‡ Speaking of the plague of Egypt in 1800 and 1801, Sir Jamese M'Gregor tells us, that of thirteen physicians, seven were attacked with the disease, and that of this number four died.

§ Bertrand p. 92.

The infection, too, was very much increased from another source not less dangerous. An opinion prevailed that the dogs received the contagion from contact with infected clothes, and thereby became the means of spreading it still more extensively; the consequence was, an order to destroy them: in a few days the streets were strewed with their carcasses; a prodigious quantity were thrown into the water; these also were soon cast upon the shore, where, by the action of a hot sun, the air was filled with the most noxious vapours. Infected clothing and furniture were also continually thrown into the streets from the windows of the houses in which the disease prevailed; and, if possible, still further to give wings to the poison, fires were injudiciously had recourse to, for the purpose of destroying the infection: "at hours appointed," says Bertrand, "the whole city appeared on fire, and the air became loaded with a thick black smoke, better calculated to retain than to dissipate the contagious vapour."* In fact, these fires, he adds, appeared to relume that of the contagion; "they heated the air, already rendered suffocating by the heat of the season and climate; the pestilential poison became more active, and the disease acquired new force."†

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* Bertrand. p. 145

5th. The plague of Aleppo, in 1760, 1761, and 1762, might also be cited upon this occasion, as well as many others, both anterior and subsequent to that period, to show that the epidemic influence of this disease is chiefly dependent upon the atmosphere into which it may be introduced.

6th. I cannot however pass over without comment, the plague which the British and French troops suffered during the celebrated expedition to Egypt in 1800 and 1801, inasmuch as it will show, that this disease, even in its *native* climate, is governed by the same laws of communication which have been observed when it has been introduced into other countries.

We are accordingly told, by the learned Dr. Wittman,‡ "that the disease is more prevalent at

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* Bertrand, p. 74.

† Ibid, p. 75.

‡ Travels in Egypt, p. 525.

Rosetta than in any other town, or part of Egypt;" he adds, "the streets of Rosetta are extremely narrow and very dirty. The crowded manner in which the inhabitants live together would appear sufficient, in a stagnant state of the atmosphere, in most of their towns, to generate pestilential or malignant diseases. The very few comforts and conveniencies which fall to the lot of the poorer class of the natives in Egypt, by far the most numerous, would lead one naturally to expect great mortality when the plague prevails among them. Dreadful examples are seen annually to happen." In another part of the same work, he is still more explicit on this point, showing that the plague "does not always possess the same activity and force;" and the necessity, as he expresses it, of some "*powerful agent to put the contagion into action, and give it its full force.*" He then asks, "May this agent reside in the atmosphere? Does this peculiar constitution of the air consist in a superabundance, or diminution, of the ordinary proportion of oxygen in the atmosphere? or in the combination of some peculiar gas or gases diffused in it?" He suggests that a series of eudiometrical and other observations, continued for several years, might throw some light on this subject: "Time alone," he adds, "may unfold this mystery."* But when we take into view the facts he has already stated, relative to Rosetta, and are told by the same author, that in Egypt the plague prevails when the Nile is low, and of course the air loaded with the impurities thence arising; that at Constantinople, the cold weather, in winter, puts a period to its progress, and the still more general observation, that the extremes both of heat and cold are unfavourable to the propagation of plague: these facts, in connexion with those already stated of this disease, as it has appeared at different times and in different parts of the world, are certainly calculated to dissipate much of the mystery in which this subject has been enveloped. The remarks of Dr. M'Gregor, (now Sir James M'Gregor, principal of the medical staff,) that the plague varies its type according to the state of the air, and other circumstances, and that by ventilation, fumigation, and attention to cleanliness, the progress of the disease was arrested,* also serve to confirm the correctness of the view which has been taken of this subject. Even the writings of Assalini, who disbelieves the communication of this disease by contagion, furnish additional support to the principle here contended for; for he admits, that when persons are shut up and crowded together, in infected places, the disease is readily contracted.† In another place, he observes, "that if a person be exposed to breathe the infected air in the chamber of a patient, or should he stay too long in the same atmosphere, he will run a great risk of contracting the prevailing malady."‡ He moreover proceeds; in order to prevent all suspicion, and avoid all danger of carrying the disease where it has not been before, that they should take nothing with them but the necessaries of life; they should avoid, as much as possible, halting in villages; and each time when they happen to encamp, they should expose their baggage and clothes to the air, which would not fail of dispersing every particle of contagion. As a further evidence, too, of the connexion between the prevalence of the disease and the state of the air, he remarks, that during the epidemic, "the inhabitants residing near the sea were more exposed than those who were at some distance, and that there were several villages situated on the heights which had not even a single sick person." In many other parts of his work, he shows that his mind was not totally divested of belief in the communication of the plague by contagion; and when danger approaches, like some modern professors in religion, he proves himself to be the practical infidel, by distrusting even his own doctrines; for he takes great pains to inform us of the various means he made use of to protect himself against the disease, and which are both as efficient and judicious as the most sturdy contagionist could possibly have employed. Imlac, in Rasselas, speaking of the appearance of departed spirits, says, "Some who deny it with their tongues, confess it by their fears." So with Assalini, and, indeed, the same may be said of many others who *affect* to disbelieve the doctrine of contagion, but who are among the first to fly from the disease wherever it may make its appearance.

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* Travels in Egypt, p. 533.

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* Med. Sketches, p. 111.

† Observations sur la Peste.

‡ Observations, &c.

7th. In addition to the details cited from Thucydides, Livy, and from the writers of modern times. I might here introduce similar facts recorded of the plague of Florence, which appeared in that city in 1348.*

But to conclude upon this part of the subject, and in the language of Dr. Chisholm himself, "Every physician who has delivered his opinion of the origin of the plague maintains, that a peculiar state of the air is absolutely necessary to establish the powers of contagion, and give circulation to the imported infection."†

Another disease which I have placed in the same class with the plague, and have considered as governed by the same laws of communication, is *dysentery*. By this disease I mean not that local affection of the bowels which is frequently symptomatic of diarrhœa, and unaccompanied with fever, but that form of it which has been described by Sir John Pringle, Sir Gilbert Blane, and other practical writers, under the title of epidemic dysentery, or the dysentery of camps.

This disease, like the plague, appears also to derive much of its infectious character from the condition of the atmosphere in which it takes place: in pure air, where cleanliness and ventilation are attended to, it rarely extends beyond the individual in whom it first originates; but in a vitiated atmosphere, loaded with moisture, marsh effluvia, or the perspirable matter, and other excretions of the human body, especially where many persons are crowded together and in small apartments, dysentery communicates itself to the greater part of those who may be exposed to its influence. Zimmerman remarks, that "in general it appears to him that dysentery became contagious purely through nastiness and the crowding many people together in a small space, but was by no means so of itself."*

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* See Introduction to Boccacio's Decameron.

† Essay on the Malignant Pestilential Fever, vol. I. p. 286.

And as a further evidence that the disease was derived not from the noxious qualities of the atmosphere alone, but from contagion communicated through that vitiated medium, he also observes of the dysentery which occurred at Dettingen, in 1743, that such of the officers, among whom it was not so general as among the soldiers, as had lain wet at Dettingen were first attacked by it; the rest received it by contagion; but a regiment that had not lain in the damp, nor been exposed to the rain, remained perfectly free from it, at a small distance from the camp; though, excepting that they were not subject to the contagious effluvia of the rest, "they breathed the same air, ate the same provisions, and drank the same water."† And in the hospital in the village of Feckenheim, about a league from the camp, the dysentery being introduced, "the air became infected to such a degree that not only the rest of the patients, but even the apothecary, nurses, and the other servants, with most of the inhabitants of the village, were infected."†

Dr. Donald Munro, who, as an army physician, had frequent opportunities of observing the cha-

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[*] Zimmerman on Dysentery, p. 20.

[†] Ibid. p. 26.

[‡] Ibid. 139.

racter and progress of dysentery, ascribes the greater violence of this disease to obstructed perspiration, moist and putrid vapours, the putrid steams of dead horses, of the privies, excrements not covered with earth, or to the unwholesome, moist, putrescent vapours of marshy or wet grounds, or pools of stagnated water acted upon by the heat of summer, and of other corrupted animal or vegetable substances, all which served to increase the infection. Hence he observes that in camps the more hot and rainy the season, the more wet and marshy the ground, and the more the air is replete with putrid vapours, the more frequent and the more fatal is the dysentery.*

The remarks of Sir John Pringle are also in point on this subject. "Some dysenteries," he observes, "appear upon first taking the field, but the cases are never so bad nor nearly so frequent, as towards the end of summer; they then become epidemic and contagious. They have always been numerous and worst after hot and close summers, especially in fixed camps, or when the men lay wet after a march in warm weather."† "In general the contagion does not suddenly spread; for whole towns and camps are never seized at once from the impurities of the atmosphere; but the infection is carried from one to another by the effluvia, or clothes and bedding, &c. as in the plague." "In camps the contagion passes from one who is ill to his companions in the same tent, and from thence, perhaps, to the next." "The foul straw," he adds, "becomes infectious, but the greatest sources of infection are the privies, after they have received the dysenteric excrements of those who first sicken. The hospitals likewise spread it, since those who were admitted with the flux not only gave it to the rest of the patients, but to the nurses and other attendants of the sick."* And to show that this disease is not dependent on a general constitution of the atmosphere, but upon that which is impure, and to which the dysenteric taint has been communicated, he observes of the epidemic which raged at Nimeguen, in 1736, "that none of the neighbouring towns suffered, unless by their communication with the place infected."† Similar facts, illustrative of the rapid extension of this disease, when introduced into ships of war, are recorded by Dr. Blane, in his valuable work on the Diseases of Seamen.

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* Diseases of the Army, v. I. p. 314—316.

† Ibid. 218. ed. 7th.

That the contagiousness of *typhus fever* is, also in a great degree, ascribable to a similar condition of atmosphere as its pabulum, is demonstrated by facts recorded in almost every book of practice, more especially in those relating to the diseases of the army and navy, which have ever been found to be nurseries of this disease. The observations made upon this subject by the Linds, Pringle, Blane, Percival, Smyth, Trotter, Haygarth, Ferriar, Currie, and others, relating to the spread of this disease, when introduced into hospitals and ships of war; its prevalence and diffusion among the poor of London, Edinburgh, Liverpool, and the manufacturing towns of Great Britain; the beneficial effects which have been derived from the establishment of fever wards, and houses of recovery, the advantages which have been experienced from the fumigating or oxygenating processes introduced by Dr. Johnstone of Worcester, Guyton De Morveau, and Carmichael Smyth, in arresting the progress of the typhus fever, all irresistibly lead to the conclusion, that the impurities of the air constitute the fuel of this disease; and, to use the expressive language of Dr. Ferriar of Manchester, in a late communication which I have received from that learned physician, that "dilution with atmospheric air is now ascertained to be the most effectual mean of destroying contagion, and of controlling the ravages of this disease."[†]

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* Diseases of the Army, v. I. p. 254. † Ibid. p. 252.

Were it necessary, I might adduce a volume of additional testimony on this subject. I cannot, however, omit the following pertinent remark of Dr. Haygarth, who, like another Howard, has devoted his life to the investigation of this interesting subject; and to whom Great Britain is indebted for the first establishment of institutions specially devoted to the important purpose of arresting the progress of contagious diseases. In his remarks on the nature of the contagion which produces putrid fevers, he observes, "I soon discovered that their infectious atmosphere was limited to much narrower extent than even the small-pox. So manifestly I observed this to be the case, that in a clean, well aired room, of a moderate size, the contagious poison is so much diluted with fresh air, that it very rarely produces the dis-

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[*] See American Med. and Phil. Register, vol. II.

temper, even in nurses exposed to all the putrid miasms of the breath, perspiration, fæces, &c. whereas, in the close, dirty, and small rooms of the poor, the whole family, generally, caught the fever. Hence we may conclude, that in well-aired and clean apartments, the air is seldom so fully impregnated with the poison as to acquire an infectious quality."*

The observations of the late Dr. Willan are also in point on this subject. "Formerly," says that accurate observer, "the typhus, with petechiæ, &c. often occurred in our prisons, and proved fatal to those who were under confinement in close cells, or who lodged in crowded apartments. Mr. Box, surgeon of Newgate, informs me that the fever has been rendered less frequent there, and less virulent, by removing the persons first affected, into airy rooms, or wards, and by a general attention to ventilation, cleanliness, &c. so that, at present, petechiæ do not appear in more than one case in thirty."† And of three hundred and seventy-nine patients committed into the London House of Recovery, says Dr. T. Bateman, nine only, or about one in forty-two, were affected with petechiæ.‡

The facts which have been ascertained relative to the communication of *yellow fever*, furnish no less conclusive evidence that this disease, like those already noticed, is, or is not, generally contagious, depending on the qualities of the air to which it may be communicated. The history of every visitation of the disease, in the United States, establishes this truth. It has not only regularly made its first appearance in our sea-port towns, and in those places where the air is most impure; at that season of the year, and in those seasons when such impurities acquire their greatest virulence; in those houses which are most crowded with inhabitants, and where there is the least attention paid to cleanliness; but, wherever the same disease has been thence conveyed to other parts of the same city, or town, or into the country, it either was propagated or extinguished, according to the *local* circumstances of the place to which it was so conveyed.

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* Proceedings of the Board of Health in Manchester.—Letter from Dr. Haygarth to Dr. Percival, p. 8.

† Willan on Cutaneous Diseases, p. 469.

‡ Ibid.

Dr. Lining, in his description of the yellow fever which was introduced into the city of Charleston in 1732, 1739, 1745, and in 1748, observes, that, although the infection was spread with great celerity through the town, yet, if any from the country received it in town, and sickened on their return home, the infection spread no further, not even so much as to one in the same house. He remarks, that the disease was generally more fatal to those who lay in small chambers not conveniently situated for the admission of fresh air.*

The yellow fever with which the city of New-York was visited in 1791, and which was introduced by a vessel from the West Indies, and rendered memorable by the death of one of our most respected citizens, General Malcolm, who was the first victim to the epidemic of that season, is thus recorded by Dr. Jonas Addoms, in his excellent dissertation on that disease:

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* Edin. Phys. and Lit. Essay, vol. II. p. 408. 427.

"About the middle of August, 1791, a contagious fever appeared in the city of New-York, which first discovered itself near Peck-slip, a part of the city thickly inhabited, its houses generally small, and badly ventilated; many of the inhabitants were in indigent circumstances, which is a frequent cause of the want of cleanliness. Here it raged a considerable time; it then began to spread, as some attendants on the sick became infected who lived in other neighbourhoods. By this means it was carried to other families, and most generally could be traced to this source. It likewise proved more particularly fatal near the place where it first appeared, than in any other part. Thus at length it spread through the city, until about the middle of October, when the weather growing a little cooler, the disease greatly abated, and in a short time, totally disappeared."*

Dr. Addoms, the author of that dissertation, since that time resided many years in St. Croix, and being associated with a celebrated physician of that island, the late Dr. Gordon, had ample opportunities of seeing the yellow fever in all its forms. During his last visit to this city, not long before his death, he informed me that the disease which he had seen in New-York in 1791, was precisely the same which he afterwards saw in St. Croix, and which frequently prevailed during his residence there, more especially among Europeans newly arrived within the tropics. He also remarked, at the same time, that this disease always acquired new virulence, and was rendered highly contagious, when introduced among soldiers crowded in barracks, or on shipboard.

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* Inaugural Dissertation on Yellow Fever, p. 7.

3d. In the yellow fever of 1793, which was in-introduced into the city of Philadelphia from the West Indies, it is conceded, on all sides, that the disease made its first appearance in Water-street, and that all the cases of this fever were, for two or three weeks, evidently traced to that particular spot. It is also a fact well ascertained, that in the vicinity of the place where the infection was first received, the air was, at the same time, in a very offensive condition from a quantity of damaged coffee which was exposed upon the dock, and under circumstances favourable to its putrefaction and exhalation. From that place the disease gradually infected a considerable part of the city, the Northern Liberties and district of Southwark, and did not subside until terminated by frost, after having been fatal to nearly five thousand persons.

It is also to be remarked, that its ravages were chiefly confined to the poor, and to those parts of the city where the houses were small, and the least attention given to cleanliness and ventilation. In the language of Mr. Carey, "it was dreadfully destructive among the poor. It is very probable that at least seven-eighths of the number of the dead were of that class; the inhabitants of dirty houses have severely expiated their neglect of cleanliness and decency by the number of them that have fallen sacrifices. Whole families, in such houses, have sunk into one silent, undistinguishing grave.

The mortality in confined streets, small alleys, and close houses, debarred the free circulation of air, has exceeded in a great proportion, that in the large streets, and well-aired houses. In some of the alleys a third or fourth of the whole of the inhabitants are no more. The streets in the suburbs that had the benefit of the country air have suffered little. It is to be particularly observed that, in general, the more remote the streets were from Water-street, the less of the calamity they experienced."*

"Though the disease," says Dr. William Currie, "was highly contagious, the influence of the contagion was circumscribed to a narrow sphere."†

As a further evidence that it did not depend on a general condition of atmosphere, the same author remarks, "that while this formidable disease was making such ravages in the city, the country, for some miles around, was never more healthy."‡ In an other work Dr. Currie has very explicitly admitted the *qualified* contagiousness of yellow fever, observing, "that it is only contagious in situations where the air is confined, and the exhalations of the sick are permitted to accumulate, through neglect of frequently changing the bed and body linen of the patient."§

4th. Similar facts are recorded of the visitation which New-York experienced of the same disease in 1795. Upon another occasion I shall make public the evidence which is in my possession, indisputably proving the importation of the yellow fever of that season from Port-au-Prince. In that year the disease appeared upon the east side of the city, first affecting some seamen who had received the infection from a brig directly from Port-au-Prince; from thence it spread in the vicinity from Dover-street to Peck-slip; but throughout that season it was confined, in a great degree, to that part of the town where the local condition of the atmosphere was peculiarly favourable to its diffusion; for not only an unusual quantity of filth was accumulated in Peck-slip, but at that very time a great number of emigrant poor had arrived from England, Ireland, and Scotland, so that the numerous lodging houses, especially in that neighbourhood, were unusually crowded; add to this, that the weather was uncommonly moist, and thereby particularly calculated to spread the infection. According to the statement made by Dr. Bayley, it was especially fatal to the emigrants of that very summer; for "out of nearly eight hundred persons who died," he observes, "not more than one hundred and fifty were citizens of New-York."*

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* Carey's Account, 4th edit. p. 61, 62.

† Treatise on the Synochus Icterodes, p. 8.

‡ Ibid. p. 11.

§ See Observ. on the Yellow Fever, in the Philad. Med. and Phys. Jour. vol. II. part 1.

In another part of the same statement he remarks; "so limited was the operation of the contagion, that the number of those taken sick in low situations, compared with those residing in more elevated parts of the city, may be computed as twenty to one."†

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* See Bayley on the Epidemic of 1795, p. 90.

† Ibid. p. 30.—See also Letters to Dr. Buel by E. H. Smith.

5th. In 1798 New-York was again visited with this scourge of our sea-port towns: during the months of August, September, and October, about two thousand persons fell victims to this disease, at the end of which time a keen frost put an almost instantaneous termination to its progress. The disease of that season first appeared at the ship-yards, in the neighbourhood of New-slip, and, as in former years, was introduced from the West Indies.* After cutting off several persons in the neighbourhood in which it commenced, the same vessel was removed to the Coffee-House slip, also on the east side of the city; from thence the disease was communicated by those who worked on board to a thickly-settled part of the city, where the houses are small, the streets narrow, and chiefly occupied by the poor; viz. Cliff-street, John-street, Ann-street, Fair-street, Eden's-alley, and Rider-street; at the same time, however, it still continued to extend its ravages in the vicinity of the place to which the poison had been first communicated; and to some other thickly-settled parts of the town, to which it was subsequently conveyed. In a short time afterwards it was introduced into Pearl-street, and in that part of it between Burling and Peck slips, where it spread very extensively. In that season a number of circumstances occurred to diffuse the contagion in that part of the city; a great quantity of rain had fallen, so as to overflow the cellars in Pearl-street, which were, at the same time, stored with salted provisions; these were soon afterwards spoiled, and loaded the atmosphere with a highly offensive vapour; the disease raging at that time in that neighbourhood, acquired new virulence, and, for the most part, followed the course of the vitiated atmosphere; "beyond the limits of which," says Mr. Webster, "the disease exhibited little infection:" indeed the extension of this disease, as has already been frequently observed, was so circumscribed within the limits of this impure air, that it became very generally believed that, in that season, whatever may have been the case in former years, the disease exclusively arose from those domestic sources, more especially from the putrid provisions. But that the yellow fever of that season did not derive its origin from the spoiled beef is evident, not only from the fact that the disease had already previously appeared in other parts of the town, and even in that very neighbourhood, before those heavy rains had fallen, and their pernicious effects were perceived; but also that those tainted provisions, unaccompanied with the specific poison of the disease, did not of themselves communicate infection to those who were constantly exposed to their effluvia.

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* See Statement of Facts on this subject by the Rev. Dr. M'Knight, in the Amer. Med. and Phil. Reg. vol. III.

Mr. Edmund Prior, the inspector-general of beef at that time, informed me, that of forty persons whom he had employed in examining the beef, and in removing and emptying such barrels as were found in a putrid state, not one was taken ill of the yellow fever.* But Dr. Chisholm and

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* See Note C.

Dr. Stewart have abundantly shown, that decomposed animal or vegetable matters will not, of themselves, produce the pestilence;* and that this disease is generated in the human system, and communicated from one person to another, by a peculiar secretion from the morbid body. My object is to show, that when such virus is introduced into a certain state of atmosphere, the disease is readily multiplied and communicated, but that beyond that atmosphere it is rarely infectious.

Although the diseases which have been noticed are rarely communicable in pure air, and are not generally contagious in the country, it is not less true, that in some few instances, it appears, either that the virus, as secreted from the diseased body, is alone, in sufficient quantity, or possesses a sufficient degree of virulence, to reproduce such diseases; or, that by means of the impurities collected about the diseased individual, occasioned by inattention to cleanliness and change of clothing, the retention of his excretions, or the confined air of his apartment, the virus itself becomes multiplied, and thereby the means of communicating the disease from one to another are in the same degree increased: for it is a fact not to be questioned, that instances of yellow fever, as well as of the plague, dysentery, and typhus fever, have been occasionally infectious, even in the more pure air of the country, though it must be acknowledged that such cases are of rare occurrence.

It is observed by Dr. Rush, whose records of the several visitations of the yellow fever in the city of Philadelphia will be lasting monuments of the facts which they contain, as well as the impressive and eloquent manner in which they are related, "that out of upwards of one thousand persons who have carried this disease into the country from our cities, there are not more than three or four instances to be met with of its having been propagated by contagion."* Such instances, however, have occurred in New-Hampshire, as related by Dr. Spalding;† in Connecticut, as stated by Dr. William Moore, of this city:‡ on Staten Island, in 1798, as recorded by Dr. R. C. Moore;§ at Huntington, on Long-Island, in 1795 and 1798;‖ and at Germantown, in the vicinity of Philadelphia, as related by Dr. Wistar.¶ But these very exceptions, if they can with propriety be denominated exceptions, manifestly prove the specific character of those diseases, and that they are propagated by a specific secretion peculiar to each disease, whether it be plague, dysentery, or yellow fever. Indeed, to use the emphatic expression of the Edinburgh Reviewers on this subject, "In the present state of medical knowledge, it would not be at all more absurd to deny the existence of fever altogether, than to maintain that it is not propagated by contagion."* But, in the language which Dr. Mead has applied to the plague, we may say of all the diseases of this class, "that a corrupted state of the air is, without doubt, necessary to give these contagious atoms their full force."†

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* See Note D.

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* Observations on the Origin of the Yellow Fever of 1799, p. 12.

† Med. Repos. vol. III. p. 8.

‡ Addoms's Disser. p. 7. Amer. Med. and Phil. Reg. vol. II. p. 177.

§ Ibid. vol. II. p. 22.

‖ Ibid. vol. III. p. 191.

¶ Additional Facts and Observations by the College of Physicians of Philadelphia, p. 30.—See Note E.

If it were necessary, I might go on to cite every return of the yellow fever with which the United States have been visited, to show that the progress of the pestilential poison has ever been commensurate with the impurities of the atmosphere, and that, when sufficiently diluted with pure air, it ceases to propagate itself.

It is probably owing to this impure condition of the atmosphere that the various fevers, and the greater mortality of diseases in general, are to be ascribed, which physicians have frequently observed to precede the appearance of pestilential disorders, and to announce their approach, and which have led many to conclude that the pestilence itself was thus engendered by local circumstances, and not imported. Facts of this nature have served to mislead the editors of the Medical Repository, and many other late writers, who thus confound the exciting and predisposing causes of disease; who do not discriminate between the inflammable materials, and the spark which lights the flame; but have identified the domestic circumstances which have served to diffuse the poison of yellow fever, with the peculiar virus itself, by which that disease has been introduced into the various cities of the United States.

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* Edinburgh Review, vol. I. 246.

† Mead's Medical Works.

The same local circumstances, I believe, will go far in accounting for the "pestilential state of the air," the "secret constitution of atmosphere," so often recorded by writers on epidemics; at the same time that they teach us, that the diseases now under consideration are only epidemic in as far as the vitiated state of the air is itself epidemic.

I however wish it to be understood, that I do not exclude the influence of bodily predisposition, the passions of the mind, and many other circumstances, in aiding the propagation of pestilential diseases.

Having, as I trust, shown, by the facts that have been adduced, that the plague, dysentery, typhus, and yellow fever, constituting the third class of contagious diseases, require an impure state of the air to diffuse and multiply them, the question next presents itself, in what manner does such impure air operate in spreading those diseases? Upon this part of the subject I have the misfortune to differ from Dr. Chisholm, no less than I do as to the necessity of such an atmosphere to propagate the peculiar poison of each of those diseases. Dr. Chisholm observes, that if the proposition had been advanced, "that those diseases, particularly the pestilential yellow fever, are rendered more violent in their action under the circumstances stated of an impure atmosphere, that no possible objection could be made to it, inasmuch as it is supported and proved by all experience;" and he proceeds to express the opinion that such an atmosphere may have an effect "by rendering the system of the healthy person, who receives the poison from the sick, more susceptible at the moment of its introduction, of its peculiar action;" but that this multiplying power does not proceed from any action of the air upon the peculiar virus of those diseases; that "it does not proceed from the impure atmosphere becoming assimilated to the poison introduced."

That air, deprived of its due proportion of oxygen, and loaded with mephitic materials, especially the confined excretions of the human body, will vitiate the mass of circulating fluids, and impair the functions of the nervous system, cannot be denied; that the febrile diseases with which the system may be affected while in this state, will acquire an extraordinary degree of malignancy, will also be readily conceded; but that such condition, either of the atmosphere, or of the human system, increases its susceptibility to be acted upon by the virus of those contagious diseases, composing the third class, does not correspond either with the facts which have fallen under my own observation, or with those I have been enabled to obtain from the writings and observations of others.

The well known facts relative to the communication of "jail fever" to the judges presiding at the Black Assizes, in 1577,* and a similar infection being communicated to the judges on the bench, and other persons present, at the sessions held at the Old Baily, in 1750, while the prisoners themselves remained in health, insensible to infection, furnish incontestible evidence of the effects of habit in diminishing the insensibility to the poison of fever: and with regard to the yellow fever, it assuredly has not been the case in the United States, that those who are most accustomed to the impure air of the place in which the disease prevailed, were more susceptible of the disorder than those who had recently arrived from the pure air of the country, or from the more elevated parts of the town. On the contrary, those who were least accustomed to the impure air of the city, or of the infected spot, were uniformly observed to be most suscepitible of the contagion. Those, too, who enjoyed the most vigorous health, and the most robust constitutions, the reverse of that condition of body which would be the effect of a residence in impure air, were more readily infected upon coming into the atmosphere impregnated with the contagion, than those who had remained constantly exposed to its influence. Whatever differences of opinion have existed among the physicians of the United States, as to the origin of the disease, they are all perfectly agreed relative to the facts which I have just stated. Indeed, Dr. Chisholm himself inadvertently admits the same to be true; for he observes, that, in the West Indies, sailors, soldiers, and young men, especially those who had recently arrived from Europe, and are least accustomed to the climate, were more obnoxious to it than others.†

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* Bacon's Works, vol. II. Stowe's Chronicle.—See note F.

Dr. Gordon, and indeed, all the most distinguished practical writers on this subject, concur in the

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[*] Chisholm's Letter to Haygarth, p. 182, &c.

same observation. "New comers," says Dr. Gordon, in the appendix to Dr. Chisholm's late valuable letter to Dr. Haygarth, "were infected with the pestilential fever, while the old seasoned soldiers had only the common tropical remittents; and this was universally the case whenever both diseases were at the same time epidemic."[*] A similar, and still more general, observation on the predisposition of those who are unaccustomed to impure air, is made by Dr. Blane. "Infection," says he, "like some other poisons, does not so readily affect those who are accustomed to it, and therefore those who are in the habit of being exposed to it, frequently escape its bad effects." For the like reason, he adds "physicians and nurses are less susceptible than others; and strangers, who are accustomed to a pure air, are the most susceptible of any."[†] With these facts and observations before us, we are compelled to conclude, that the impure air necessary to propagate the contagion does not operate in the manner Dr. Chisholm supposes, by "increasing the susceptibility of the system to the action of the poison introduced." On the contrary, I believe that it produces its effects by some chemical combination with the peculiar virus secreted from the diseased body, and that thereby the contagion becomes more or less extensively multiplied, according to the extent and virulence of such vitiated atmosphere.

I shall not attempt to define the precise nature of the chemical union which takes place under such circumstances. But I wish it to be distinctly understood, that in such combination, I do not believe, with those writers who contend that a *tertium quid* is produced; or, as Dr. Adams of London, in his late publication on Epidemics, has reiterated the same idea, "that a new kind of air is generated."* On the contrary, as far as I am enabled to view the subject in connexion with the facts usually observed during the prevalence of the diseases which have been noticed, I am inclined to believe, that in this combination the peculiar virus of those diseases is in no way changed, but multiplied; and that this multiplying power is a process very analogous to that which we observe to take place in the assimilation of the fluids of the human body to the peculiar taint which may be introduced into the system, as, for instance, in small-pox and syphilis; or, perhaps, that it more nearly resembles the process of fermentation, as it occurs in inanimate matter. By both these processes such an assimilation takes place in the fluids acted upon, whether of the living body or in dead matter, that they partake of the same properties with the virus or ferment introduced, and are thereby rendered capable of renewing the same process in other bodies under similar circumstances. This process has very properly been denominated by Dr. Walker, the *assimilating fermentation*,† and has been no less successfully employed both by him and by Mr. Cruikshank,‡ as well as by Dr. Cullen, to explain the changes which take place in the living system, acted upon by small-pox, and the virus of other contagious diseases, than it has been by Sir J. Pringle,* Macbride,† and Alexander,‡ to the phenomena of fermentation, as it occurs out of the body.§ The history of plague, dysentery, and typhus fever, as well as the recent observations in animal chemistry, furnish a variety of facts which may be adduced in illustration of such fermentative process taking place in the atmosphere, and in watery fluids loaded with the excretions of the human body, or the vapours of vegetable and animal substances in a state of putrefaction.

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[*] Chisholm's Letter to Haygarth, p. 220.

[†] Diseases of Seamen, p. 223.

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* Adams on Epidemics, p. 11.

† Walker's Inquiry into the Small-pox.

‡ Anatomy of the Absorbing Vessels.

Similar facts, illustrative of the fermentative process contended for, have been observed whenever the yellow fever has prevailed in any of the cities or towns of the United States. I have already stated, that this disease has always prevailed in proportion to the presence of such fermentable materials. It is no less true, that whenever the disease has been introduced, it has spread in the greatest degree in those seasons when the air was unusually moist: this was remarkably the case in New-York, in 1795‖ and 1798,¶ and in Philadelphia, in 1793 and 1798:** and that the yellow fever has prevailed in the United States in those seasons when the heat, combined with moisture, was most favourable to such assimilating or fermentative process, is also proverbially true. It is also to be observed, as universally admitted, that the same disease has uniformly been extinguished by the approach of frost, which destroys such fermentative process.

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* Diseases of the Army, Appendix.

† Experimental Essays.

‡ Experimental Essays and Experimental Inquiry.

§ See Note G.

‖ See Bayley on the Yellow Fever of 1795.

¶ Hardie on the Yellow Fever of 1798.

** See Rush and Currie.

Another argument in favour of this explanation is derived from the fact, that this disease has, in several instances, been introduced into our cities, without extending beyond the individuals who have introduced it; manifestly owing to the active exertions of a vigilant police, at the same time that every attention was paid in preserving cleanliness about the persons of the sick. This was remarkably the case in the year 1804, when the yellow fever was introduced at the Wallabout, on Long-Island, and in 1809, when the same disease prevailed at Brooklyn. In each of those years the fever was introduced into this city by persons who had received the infection on Long-Island, but, owing to the circumstances just mentioned, it was not communicated to others: while the same disorder, owing to local circumstances, spread in the vicinity of those places on Long-Island where it had first appeared.*

During the year 1811, the yellow fever was also introduced into the city of Amboy, New-Jersey, from the Havana, but did not spread beyond those persons who were first attacked in consequence of their immediate exposure to the air of the infected vessel. The local circumstances of Amboy, its elevated situation, its dry and sandy soil, its wide streets and spacious houses, their distance from each other, and the remarkable cleanliness of the town, most satisfactorily account for the sudden extinction of the disease, while the evidence of its importation must be admitted to be conclusive.*

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* American Med. and Phil. Reg. vol. II. p. 95, &c.

But there is another circumstance which particularly merits attention: in every epidemic visitation of the yellow fever, several days, viz. from eight to twelve, or fourteen, have generally elapsed between the first cases that appeared, and the communication of it to other persons, even in the same neighbourhood: insomuch that not only our citizens, but our physicians themselves, have been led to doubt the existence of the disease, and to stigmatize as alarmists those who first announced the deadly visiter.† I can never forget the occasion, in 1795, when that venerable and experienced physician, the late Dr. John Bard, assembled the physicians of this city to announce to them the first cases of this disease which he had observed in the family of his friend, Mr. Jenkins. The physicians met, but declared they had seen no other fevers than what they had been accustomed to observe every year, and even doubted, on that occasion, the correctness of Dr. Bard's observations, relative to the nature and character of the disease to which he called their attention: but that accurate observer had been too familiarly conversant with the yellow fever as it appeared in New-York in 1743 and 1762, and too well knew the pathognomonic symptoms of that disease to confound it with the fevers of our own climate: he, accordingly, in the most emphatic language, replied to their doubts, "Gentlemen, within a fortnight you will all see and acknowledge the West India yellow fever to exist in our city." The event is well known.* The same interval between the first cases of the disease, and its subsequent diffusion in the neighbourhood where it first made its appearance, is noticed by almost every writer who has recorded the yellow fever in the United States.

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* See American Med. and Phil. Reg. vol. III. also Edinburgh Med. and Surg. Journal, and the Med. and Phys. Journal of London.—See Note H.

† See Note I.

A similar interval has been frequently noticed in the history of the plague. Dr. Russel, in his account of the plague of Marseilles, in 1720, observes, "that from the 12th of July to the 23d there was a deceitful pause, during which the popular apprehensions began to subside. The physicians were reproached with ignorance in having mistaken ordinary fevers for the plague. The disease, however, in this interval, had continued to spread in the Rue de l'Escale, where it made its first appearance."†

It has also been remarked of the plague, as well as of the yellow fever, that the infection spread most rapidly when the atmosphere was not only heated and loaded with moisture, but when it was least agitated by wind or thunder-storms. During those calms, when the air may be said to be relatively at rest, it has been uniformly remarked, that the contagion of the yellow fever has multiplied itself most extensively, as was always very apparent by the greater number that were seized within five or six days after such close weather had been observed, all which circumstances certainly conspire to promote the fermentative process that has been contended for.

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* See Bayley and Hardie on the Epidemic of 1795.—See also Currie on the Fever of 1799.

† History of the Plague.

This is not all: whenever the yellow fever has been introduced into the cities of the United States, its first extension has always been slow and gradual. Upon several occasions its boundaries have been accurately defined by our board of health. This, as I have stated on a former occasion, was remarkably the case in this city in 1805. The disease, in that year, was confined, for some weeks, to a small portion of the eastern side of the city, and, as stated by the board of health, "not a case occurred in any part of the town, that was not referrible to that as its source."* This fact being ascertained, the board accordingly forbade intercourse with the infected portion of our city, and ordered an abandonment of that part of the town, threatening violent measures if their orders were not immediately complied with. In a short time after, the infection extended a few streets further; the board of health again defined its limits, and again declared that still not a case had occurred that could not be traced to this part of the city as its source.*

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* Hardie's Account of the Malignant Fever of 1805.

Will not the same assimilating or fermentative process furnish the most satisfactory solution of the fact noticed by Boerhaave, Cullen, Lind, Russel, and many others, that *fomites* are more to be dreaded than the excretions alone proceeding from the diseased body? Not, however, in the manner those authors suppose, that such fomites acquire greater virulence; but, that by the same process the specific poison has been more extensively multiplied by means of the atmosphere and foul excretions which are involved in the clothing worn by the sick; and that by the same means the danger of the infection has been increased in the same degree that the poison has been multiplied. As a further evidence, too, that the contagion is multiplied, but not more concentrated, as those writers have imagined, it is a fact established by every writer on those contagious diseases, that the first cases of every epidemic are uniformly the most fatal; but that, as the season advances, the danger of taking the disease is increased, while the disease itself has, perhaps, become even milder than it was in the commencement.

Let me further ask, do not the processes lately introduced for disinfecting the air by means of the fumes of the acetic acid, the oxygenated muriatic acid gas, the nitric, and sulphuric acid vapours, operate by making new combinations with some of the ingredients constituting the tainted atmosphere, and thereby decomposing the morbid compound? According to Dr. Crawford, "the fluids which destroy the fœtid odours most speedily are those which are acknowledged to contain the greater portion of oxygen, and it is, therefore, extremely probable that this change depends on the union of the oxygen with animal hepatic gas, or some one of its constituent parts." But the explanation which has been offered by the late Dr. Garnett, of the manner in which the oxygen thus employed combines with the hydrogen gas which holds the morbid secretions in solution, appears to me the most satisfactory explanation that has been given of those phenomena.*

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* Chisholm's Letter to Haygarth.—See Note K.

From these facts, I have been led to conclude,

1st. That an impure atmosphere is indispensably necessary to multiply and extend the specific poison, constituting *plague*, *dysentery*, *typhus*, and *yellow fever*.

2dly. That the impurities of the atmosphere do not produce their effects in the manner suggested by Dr. Chisholm, by increasing the susceptibility of the system to be acted upon by the peculiar virus of those diseases.

3dly. That, instead of predisposing the body to be thus acted upon, the reverse is the fact; that the predisposition of those who are most exposed to such impure air is less, while those who reside in the pure air of the country are most liable to be infected when exposed to the contagion.

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* Proceedings of the Board of Health of Manchester, p. 40—42. Robertson's Treatise on Medical Police, vol. II. p. 127. Robertson's Natural History of the Atmosphere, vol. II. p. 352. See Note L.

4thly. That the impurities of the atmosphere are fermentable materials, to be called into action by the specific ferment of those diseases, aided by heat, moisture, and a calm state of the atmosphere; and that as far as such atmosphere extends, and the circumstances favourable to such fermentative or assimilating process continue, so far those diseases become epidemic, but no further.

The same idea of an assimilating process appears to be expressed by Lucretius, when, speaking of the contagiousness of the plague, he observes,

> "Proinde, ubi se cœlum, quod nobis forte venenum,
> Conmovet, atque aer inimicus serpere cœpit
> Ut nebula ac nubes paullatim repit, et omne,
> Qua graditur, conturbat, et immutare coactat.
> Fit quoque, ut in nostrum quum venit denique cœlum
> Conrumpat, reddatque sui simile, atque alienum."
>
> LUCRETIUS, de Nat. Rerum, lib. VI.

Or, as it has been rendered by that learned surgeon and accomplished scholar, John Mason Good, Esq.

> "But when the heaven of poisonous power to us,
> First moves remote, its hostile effluence creeps
> Slow, like a mist or vapour; all around
> Transforming as it passes, till at length,
> Reach'd our own region, it the total scene
> Taints, and assimilates, and loads with death."

If the view which has been taken of this subject be correct, a still more important truth is the result; that, while by a rigid and well executed system of quarantine laws we have it in our power to guard against the introduction of the spark that kindles the flame, we are also enabled, by means of domestic cleanliness and ventilation, to extinguish it when introduced. For this purpose our magistrates and guardians of the public health cannot be too attentive in their police regulations to have all noxious materials removed from our streets and our dwellings; and, at the same time that they are ornamenting our cities by the erection of magnificent buildings, and the introduction of other important improvements, they should also avail themselves of every opportunity which may present of widening our streets, and of reserving squares and other pieces of ground to be ever kept vacant, as among the most effectual means of preserving the health of our citizens, and guarding against the propagation of contagious diseases.

——τὸ Πελασγικὸν ἄργὸν αμεινον.

——"Best is Pelasgic empty"

was wisely expressed by the Pythian oracle; thereby denoting that every large and populous city, as well as Athens, should have its *pelasgics*, or vacant pieces of ground, as so many reservoirs of pure air for the purpose of counteracting the effects of contagion when introduced.

ILLUSTRATIVE NOTES.

NOTE A. (See page 267.)

Strictures on the classification of Contagious Diseases proposed in the preceding communication, contained in a letter from Colin Chisholm, M. D., F. R. S., &c. &c.

Clifton, (England) October 14, 1809.

DEAR SIR,

YOU will find in the October number of the Edinburgh Medical and Surgical Journal the observations on contagion you favoured me with some time ago.

I approve highly of the first part of your paper; but on reading the third class of your division of contagious diseases, I find myself obliged to dissent, or at least to hesitate in affixing entire approbation to it: and, indeed, I have reason to think, that when you have reconsidered the admissions and concessions you have there made, and the tendency which they have to throw all fevers, however arising, except those which are symptomatic of what are called specific contagions, and which comprise the whole of your second class, into an undefined state of anomaly, you may see cause for retracting them, or giving them more limitation. For my own part, I feel more inclined to divide all diseases of contagion into two classes, which may be denominated apyrexious and pyrexious; and as the latter are distinguished, mediately or immediately, by specific causes, they may be divided into two sections, the symptomatic and the idiopathic.

If a febrile disease has for its cause, an aura, a gaseous fluid, emanating from the body of a man labouring under that fever, which will manifest activity only within a certain, generally definable, distance from that body, how can we, with any propriety of conception or language, say, that such a disease is only communicable through the medium of an impure atmosphere? Again, is not a fever proceeding from the action of marsh miasmata different from the fever we have just been considering, inasmuch as the one is not communicable—the other is certainly communicable from the subject of it to a healthy subject? How then can we admit such a proposition as the following: "In an impure air, rendered so by the decomposition of animal and vegetable substances, as takes place in marshy countries, or by concentrated human effluvia, as in camps, jails, hospitals, or on shipboard, they (your third class) are rendered, *not only extremely malignant and mortal in themselves, but become communicable to others who approach the sick, or breathe the same atmosphere which has become assimilated to the poison introduced, insomuch, that the same specific disease is communicated, whether it be plague, yellow fever, typhus, or dysentery?*" Pardon me when I say I do not understand this: when I say I perceive a marked inconsistency in it; several causes of an opposite nature producing effects all partaking of one general principle, contagion. Is not this a very near approach to the heterogeneity I have apprehended? I suspect that dysentery does not come with marked propriety into the same class with plague, yellow fever, (malignant pestilential,) and typhus, for it is certainly oftener the product of marshes than morbid animal effluvia, and partakes very often of the type of intermittents. When I thus object to your classification as it relates to pyrexious contagions, I fully admit the occurrence of hybrid fevers, that is, contagious fevers with the types of those we know to proceed from the action of marsh miasmata. But on these occasions, all the conditions which constitute pyrexious contagions are present; their form is only a little changed; their nature is unaltered: they are communicable only within the radius of contagion. That plague, or yellow fever, (by which I understand the fever to which I have given the name malignant pestilential,) more especially, "are only communicable through the medium of an impure atmosphere;" that in a pure air, in large and well ventilated apartments, &c. they are not communicated, or very rarely, are propositions which I much doubt, because they are most certainly in direct contradiction to my own experience. I speak more immediately concerning the malignant pestilential fever. Were this a fact sanctioned by universal experience, (forgive the pointed expression, it is only for your own eye,) the extirpation of this fever might, in general, be a very easy operation. But I have seen too many proofs of its contagion communicating itself to healthy persons in a pure atmosphere, to admit the validity of your definition of it. If healthy persons, or persons possessing every internal feeling and external appearance of health, passing to leeward, within six feet of other persons just recovered from the malignant pestilential fever, and wearing the clothes they had on their persons during the presence of the fever, have received the contagion of the fever from them, and have perished under its action; if this has happened in the open air (wherein nothing generally conceived to be impure, could be perceived) surely your definition cannot be said to accord with experience. Again, if in a chamber kept as clean and as pure as it is possible to keep a sick chamber, the disease has been in many hundred, I might safely say thousand, instances, communicated from the persons afflicted with it, to others in a state of apparent health, when the latter have approached the former to within the radius of contagion; if this is true, and the proofs of its being so are innumerable, I must again say, that surely your definition cannot be said to accord with experience. Had it been advanced, indeed, that all pyrexious contagions, but particularly that of the malignant pestilential (yellow) fever, are rendered more violent in their action under the circumstances you have stated, no possible objection could be made to the proposition, because it is supported and proved by all experience; and the reason is, perhaps, as obvious as the fact itself is generally admitted. It does not proceed from the impure atmosphere becoming assimilated to the poison introduced, but from rendering the system of the healthy person, who receives the poison by approximation to the sick, more susceptible, at the moment of its introduction, of its peculiar action: or the chemical physician may say, had it been advanced that the atmosphere of the sick chamber, being confined and close, as it too often is, is rendered obnoxious to health, by having its oxygen diminished by the respiration of the persons, sick and well, inhabiting it, and that thereby the effluvia of contagion become more concentered by being less subjected to decomposition or solution, whichever you will, the proposition would be less objectionable. But in either case, the laws of the existing contagion are not affected; in the one, the healthy person is only made more susceptible of its impression; in the other, it becomes less volatile, and therefore more virulent, and more certain of infecting. But the atmosphere is not assimilated to its principle. And, indeed, it must be evident, that were this not the fact, we should have no right to expect a specific disease produced by a specific contagion—plague and yellow (malignant pestilential) fever produced by the contagions peculiar to them.

But all fevers appearing in the circumstances you mention, would necessarily have an undefined character; they would be universally anomalies; a result so inconsistent with the regularity of nature, I imagine, has never been met with. There are, indeed, seeming anomalies produced by a combination of morbid causes and effects. But as these are well known to depend on the irregular performance of some particular functions, occasioned generally by morbid depositions on the organs of these functions, they lose their anomalous form in the mind of the judicious physician, and are cured by the adoption of appropriate means. Now, as the diseases which you class under your third head, have each a peculiar and well-defined character, so must they severally have a peculiar contagion; and the circumstances under which you represent them, must be considered as purely adventitious, and aiding only inasmuch as they may predispose the healthy body to be acted on by the peculiar contagion it is exposed to, or as they may render the basis of that contagion less decomposable. One word more, and I am done with my impertinent critique: are not all contagious diseases capable of communication by *fomites?* (a word which, by the by, does not seem to be well understood. Servius's comment on a passage in the first Æneid of Virgil, gives a more distinct idea of the word *fomes* than any I have met with. You know it is received by our medical lexicographers as derived from the verb *foveo*, a derivation I doubt much the correctness of. The passage I allude to you will find at verse 178, the last member of which is "rapuitque in fomite flammam;" on which Servius says, "Fomes sunt assulæ quæ ab arboribus cadunt, cûm inciduntur, et igni concipiendo commodæ sunt." Now, were we to substitute words in the following manner, we should have, I imagine, a correct idea of fomites: Fomes sunt indusiâ, panni aliaque vestimenta quæ corporibus ægrorum peste aliave febre contagiosa laborantium, cadunt; cûm incidunter et contagionè concipiendæ commodæ sunt.) If they are, what has impure atmosphere, so rendered by the decomposition of animal and vegetable substances, to do with their origin? The purest atmosphere conceivable, that is, an atmosphere in all respects well conditioned to support animal life in a perfect state, cannot prevent an attack of the malignant pestilential (yellow) fever, if a healthy person is exposed to the fomes of its contagion, and is predisposed to be acted upon by it. The remarkable proof of this which occurred at New-Haven, and which has been so ingenuously related by Dr. Munson, must be perfectly in your recollection. The present inquiry has nothing to do with those singular idiosyncrasies which resist contagion, although exposed to that of variola, rubeola, &c. as well as that of malignant pestilential fever, &c.

As the foregoing is not entirely my own opinion relative to your classification of contagious diseases, I hope, and indeed feel convinced, you will forgive the freedom I have taken in so candidly giving it. You will also, I am satisfied, receive in good part, in the spirit of true philosophy, my request, that you will reconsider particularly your third head, which I imagine is the only objectionable one. I am aware of the inconsistency which may be attributed to me in stating a proposition so opposite to that which may be found in my Essay on the Malignant Pestilential Fever, vol. I. p. 281, and in my letter to Dr. Haygarth, p. 142. But herein, I trust, I manifest that disposition which should be paramount in the minds of those whose object, in all discussions, is truth. Subsequent inquiry and reflection have convinced me that I stood not on solid ground, when I stated, that among the causes of pestilence is the product of animal substances of every description, deprived of life, and in a state of putrefaction: and I cordially agree with the critique on my letter to Haygarth, when he says, " We are more inclined to think that there is a specific contagion distinct from mere putrefaction, and which, perhaps, is not cognizable by any of our senses."—*Crit. Rev. July*, 1809.

It may be asked, as all contagious diseases proceed from certain specific or peculiar causes, what are those causes, and how arises that diversity of character assumed by contagions? To this question we must be silent; for no pathologist, however experienced, and however deep his research into nature may be, can give a satisfactory answer, We know that there is such a diversity, and, in general, we have some knowledge of the treatment they severally require. Perhaps this is as much as we ought to know. It is a subject which must for ever elude human research. Neither anatomy nor chemistry give any aid here. Exuberant fancy may, indeed, wanton in theory, and may conceive every different form of contagion as proceeding from a different combination of the same chemical principles acting differently on the organs of our frame, or on the fluids which they secrete. But strip these notions of their fancy-dress; let them stand naked before us, and they become mere phantasms.

> "Par levibus ventis, volucrique simillima somno."

Believe me to be,
Dear sir, very faithfully yours,
C. CHISHOLM.

Subsequent to the publication of my reply to this letter of Dr. Chisholm, I had the gratification to receive another communication from that learned physician, in which he expressed his conviction of the correctness of the view taken of this subject, in the foregoing papers, and in which the Editors of the Edinburgh Medical and Surgical Journal,* and the London Register and Review concur.† It also gives me pleasure to find that the doctrines contained in the two preceding essays, have been approved and adopted by the learned Dr. John Mason Good,‡ and by that distinguished practical observer, Sir Gilbert Blane.§

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* See Edin. Med. and Surg. Journal, vol. VIII. p. 165. vol. XI. p. 357.

† Annual Medical Review and Register, vol. II. p. 13—p. 102.

‡ See "Study of Medicine," vol. II. p. 74–440. London ed.

§ "Elements of Medical Logic," p. 156–172. London ed. 1819.

NOTE B. (See page 269.)

The American publishers of the New-York edition of Neale's translation of the work of Assalini on the plague of Egypt, in their introductory observations, have, among others, the following singular remark:

"The existence of such contagion [of the plague] has never been proved by the evidence of one of the senses. The contagion is a mere conceit of the mind; and all reasoning upon such a visionary and fancied agent can be but hypothesis, and have no better claim to our assent than the fluid of magnetism, and the ether of gravitation; an assumption not near so worthy of our assent, as if it had been said, that the invisible angel of destruction had literally and bodily descended, sword in hand, to execute a heavy judgment of his Lord."

In refutation of these extraordinary and unwarrantable assertions, it were an easy matter to cite a volume of evidence. The following facts, selected from others of a similar kind, will, I trust, be sufficient for the purpose of demonstrating the fallacy of the doctrine of the American publishers referred to, and the correctness of the view that has been contended for, relative to the contagious character of the plague.

Dr. Guthrie, a celebrated physician of St. Petersburgh, in his inquiries relative to the contagiousness of the plague, observes:

"Chance threw in my way an excellent opportunity of examining into the merits of this opinion, by consulting the physicians and surgeons of the Russian army, lying in the conquered Turkish provinces of Moldavia and Walachia, where the plague ever obtained more or less during the whole war, and at the beginning raged with destructive violence; and on addressing myself to Baron Ash, physician general, I had an answer that met my ideas on the subject.

"The difficulty of ascertaining the exact time when the infection is received, and, consequently, the interval that takes place before the attack of the pestilential fever, must appear upon the face of the case, except experiments were to be made on purpose, which is scarcely to be expected. However, the intrepidity of a single man has thrown some light upon the matter: this was Mathias Deggio, one of the surgeons of the hospital at Buckarest, a building appropriated to the cure of the plague in the Russian army.

"He, perceiving the gentlemen of his profession condemned, in a manner, to death, if punctual in their duty, had the resolution to inoculate himself for the plague, in the full confidence of its efficacy, and ever afterwards found himself invulnerable, whilst his companions around him were falling victims to its fury. He produced the disease by inserting, with the point of a lancet, under the epidermis of his arm, matter from a pestiferous abscess, and followed the cold regimen observed in the small-pox, as he had imitated its mode of inoculation; on the fourth day of the puncture the fever declared itself."

Dr. Guthrie adds, "the Baron then said a great deal in favour of inoculation of the plague, and supported his opinion with the case of Mathias Deggio given above; and the analogy that has been observed between the plague, small-pox," &c. (*Medical Commentaries*. Edin. vol. VIII.)

Another fact of a similar nature is recorded by Sir Robert Wilson: "That daring spirit of investigation into the causes and effects of those diseases, whose principles are yet unknown, and which has so much distinguished the profession, was not to be intimidated by the menacing consequences of a bold examination into the powers and properties of the plague.

"Dr. Whyte, an English physician, determined to discover if this malady, so destructive to a large portion of the globe, and which filled with apprehension the remainder, could not be checked, or rendered less virulent, by the introduction of inoculation.

"Resolved to become the patient of his own speculation, during the time the plague raged again at Rosetta, (which it did towards the fall of the year, when numbers of Sepoys died,) he inoculated himself with matter taken from the buboes of an infected person. The attempt failed twice; the third proved fatal; in three days after the symptoms appeared, he died, falling a much-to-be-lamented victim to a disinterested zeal, benevolently and intrepidly directed for the benefit and happiness of the community." *Wilson's Hist. of the British Expedition to Egypt*, 4to. page 257.

The highly respectable Dr. M'Gregor, *(see Medical Sketches of the Expedition to Egypt from India)* relates the same fact more circumstantially, as follows: "I know not that I can better describe the disease than by a short statement of the cases of some of the medical gentlemen who had the disease, most of whom wrote me accurately every thing that they felt. Dr. Whyte entered the pest-house at El Hammed, on the evening of the 2d of January, 1802. In a letter of that date he writes to me, 'I just now inoculated myself, by friction, with bubonic matter on the left thigh;' on the 3d, he says, 'I have this morning inoculated myself, by incision, on the right fore arm.' Mr. Rice, then doing duty in the pest-house at El Hammed, gives the whole of the case. In a letter on the 3d of January, he writes to me, 'Dr. Whyte came here last night; soon after he came in, he rubbed some matter from the bubo of a woman, on the inside of his thighs. The next morning, he inoculated himself in the wrist with a lancet, with matter taken from the running bubo of a Sepoy:' In subsequent letters Mr. Rice says 'that Dr. Whyte continued in good health on the 5th, and all day on the 6th, till the evening, when he was attacked with rigors and other febrile symptoms. After sweating profusely, he was better in the morning of the 7th, but in the afternoon the shivering returned; and after it had continued 30 minutes, a severe hot stage came on, then a profuse sweating followed, but with it much affection of the head, tremor of the limbs, particularly of the upper extremities, tongue black and dry, skin hot, pulse full, hard, and irregular, thirst, great prostration of strength, and anxiety. The head was the only place he complained of, and it seemed to be the principal seat of his disease. On the 8th, these symptoms continued, and there was some delirium; he begged to be removed from the pest-house at El Hammed, to the old pest-house at Rosetta, under the charge of the Arabs. He was removed on the morning of the 9th, and died in the afternoon of that day very delirious.' "

Another instance of the same intrepid, but benevolent effort to diminish the sufferings of humanity, is recorded by Sonnini, (*Travels into Greece and Turkey*, London ed. p. 497.) " Every physician," says that writer, " has not the courage, or, to speak more correctly, the madness of that Russian surgeon, prisoner at Constantinople with a number of his countrymen, who took it into his head to inoculate these unfortunate beings with the plague, in order to render the contagion less destructive: by this means he killed two hundred of these prisoners; and, fortunately for the rest, the inoculator, after having performed the operation on himself, died of his own treatment."

M. Assalini has stated, in corroboration of his own opinion of the non-contagiousness of the plague, that M. Desgenettes, the chief physician to the army of the East, while in Syria, inoculated himself with the matter of the plague, without taking the disease, and that he made this inoculation under the persuasion that the plague was not contagious. The following observations, taken from the work of M. Desgenettes himself, will clearly show the incorrect statement of M. Assalini on this subject, and that Dr. Desgenettes considered the contagiousness of the plague as absolutely demonstrated.

"Ce fut pour rassurer les imaginations et le courage ébranlé de l'armée, qu'au milieu de l'hôpital je trempai une lancette dans le pus d'un bubon, appartenant à un convalescent de la maladie au premier degré, et que je me fis une légere piquure dans l'aîne et au voisinage de l'aisselle, sans prendre d'autres précautions que celles de me laver avec de l'eau et du savon qui me furent offerts. J'eus pendant plus de trois semaines deux petits points d'inflammation correspondants aux deux piquures, et ils étoient encore très sensibles lorsqu'au retour d'Acre je me baignai en présence d'une partie de l'armée dans la baie de Césarée. Cette expérience incomplete, et sur laquelle je me suis vu obligé de donner quelques détails à cause du bruit qu'elle a fait, prouve peu de chose pour l'art; elle n'infirme point la transmission de la contagion, démontrée par mille exemples; elle fait seulement voir que les conditions nécessaires pour qu'elle ait lieu ne sont pas bien déterminées:" And, as a further evidence that this experiment, if it deserves the name of an experiment, was made for the purpose, as Dr. Desgenettes declares, of inspiring the troops with confidence, he adds, "Je crois avoir couru plus de danger avec un but d'utilité moins grand, lorsqu'invité par le quartier-maître de la soixante-quinzieme demi-brigade, une heure avant sa mort, à boire dans son verre une portion de son breuvage, je n'hésitai pas à lui donner cet encouragement." (*Histoire Médicale de l'Armee d'Orient, par le Medecin en Chef, R. Desgenettes*, A Paris, an x. 1802.)

In addition to the testimony of Dr. Desgenettes, I subjoin the following interesting letter from my pupil and friend, Alire R. Delile, M. D., the present Professor of Botany in the University of Montpelier, who accompanied the French army in their expedition to Egypt, and who, as a member of the Institute, had the most ample opportunity of obtaining correct information relative to the opinions of the medical staff on this subject.

DEAR SIR,

I AM happy of any opportunity which reminds you of me, and on the subject upon which you desired an answer, I am ready to give it to you.

Comparisons have been made between contagious diseases, viz. the plague of the east, and the yellow fever of America. Opinions have been deduced from the examination of facts in different cases; but facts have not always been sufficiently ascertained for us to rest our opinions indiscriminately upon them.

I was in Egypt a witness to many facts which I recollect perfectly. A report that the inoculation of the plague had been attempted in vain must have originated from letters sent from Syria to France, and notes spread afterwards through Europe and America.

I was every day in the company of medical men, in Cairo, and of people of learning, who devoted a great part of their time to study and observation, and I have heard the report of the inoculation of the plague always contradicted; nor did I ever hear M. Desgenettes relate, as attributed to him in publications, that he had tried to inoculate himself with the venom of the plague. He could not wish for any additional honour which the boldness of an attempt of that sort had, in the opinion of many, reflected upon him: any degree of honour which could gratify him, he had acquired by his frequent attendance upon the sick, by his conferring all kind of comforts upon them, and by his daring to feel their pulse, their tumours at their bed, though fatal experience had taught him that most practitioners had fallen victims to their resulution in performing such an office. But among professional men, the importance of the inoculation of the plague had induced M. Desgenettes to authenticate a fact which I consider a mere rumour has circulated.

From several of my friends and colleagues of the commission of arts, namely, M. Coquebert and M. Champy. who died of the plague, M. Pothier, who recovered, having been attended by M. Desgenettes, I have had strong reasons to convince myself of the contagiousness of the plague. The quarantine laws established of old, with a great deal of severity in France; after many distressful events, the preventive means used by the Europeans settled in the cities of the east, who, by shutting themselves and their families in houses, and by avoiding contact with people, and with every thing from out of doors, except when well washed, and who are never attacked with the disease; while the loss of those who have remained exposed to the contagion is often lamented, have been sufficient examples to convince me early of the truth of that opinion. Further I cannot say any thing from my own experience. The French physicians differed in their opinions whether the plague was indigenous or accidentally imported in Egypt, but none of them denied its contagiousness. Owing, perhaps, to the same opinion that I had, and to the natural propensity to imitate what others did with success, in avoiding, as much as they could, communication and contact, I escaped the danger, and I am happily placed in the situation to express to you the sentiments of esteem with which I remain,

Sir, your most obedient,
humble servant,

DR. HOSACK. ALIRE R. DELILE.

Without further enlarging on this head, we are, I believe, prepared to conclude, with the learned Dr. Parr, "That those who have suggested and disseminated doubts of the contagiousness of plague, are answerable for the lives of thousands, and, in some instances, have paid the forfeit with their own."—*London Medical Dictionary.*

NOTE C. (See page 296.)

I have remarked in the text, as an evidence, among others, that the yellow fever which prevailed in New-York in the year 1798, was not produced by putrid beef; that those persons who were employed in removing such putrid provisions from the city escaped the yellow fever. The same respectable gentleman, Mr. Edmund Prior, who furnished me with that fact, has also informed me, that of *forty* persons who were engaged in that particular service, under his immediate inspection, *thirty-eight* were attacked with a complaint of a very different character, the dysentery; which disease, it is well known to all practical writers, frequently arises from decomposed animal and vegetable matter, as its exciting cause.

The remaining *two* persons who had been thus employed by Mr. Prior, escaped the dysentery, with which their comrades were afflicted; but upon leaving that service, and being afterwards exposed to the contagion of yellow fever, while working on board of ships, they fell victims to that disease; a circumstance which clearly shows that dysentery and yellow fever derive their origin from different sources: for additional particulars on this head, see Sketch of the Rise and Progress of the Yellow Fever, &c. by William Currie, Philadelphia, 1800.

That the yellow fever of 1798, did not proceed from the putrid beef, to which many physicians ascribed its origin in that year, is also evident from the facts stated in the following extract from a letter which I received from the Rev. Dr. M'Knight of New-York, dated November 6th, 1809.

"In the year 1798, Melancthon Smith, and another man whose name I do not recollect, were the two first instances of the yellow fever in New-York. They had both been on board the ship Fame, as she came up to the New-Slip in the East River, where she unloaded her ballast, and emptied her bilge water. The stench occasioned thereby was so intolerable, that, the wind being south, the inhabitants on the north side of the dock had to shut up their doors and windows, and some of them left their houses. To my knowledge, as many as twelve or fifteen died in that neighbourhood, in the course of two weeks, several of whose funerals I attended. This same vessel was afterwards removed to a dock in the vicinity of the Coffee-House : there several persons, who wrought on board of her, who resided in Eden's Alley, took the fever, and carried it up into that part of the town. Just at this time, there was a very heavy rain, which filled most of the cellars in the lower part of the city. The fever raged with alarming violence on Golden Hill. It assumed the appearance of the plague."

Thus, then, it appears that many cases of the fever of that year, existed in the city, before the heavy fall of rain took place, and its effects upon the stored provisions were perceived ; consequently, the yellow fever of that season did not proceed from those putrid materials as its source. That the foul state of the air which ensued lent wings to the contagion, I trust will by all be admitted.

NOTE D. (See page 297.)

To employ the language of that distinguished medical philosopher, Dr. Chisholm, it has become a kind of axiom in medical physics, that the effluvia of decomposed animal bodies are the most certain and frequent cause of malignant and pestilential fevers.

This opinion, which has been promulgated from age to age, and which has been so generally received, because it has not been investigated, has, at length, been most ably examined and refuted by Dr. Chisholm.

From his learned and elaborate essay on this subject, I have taken the following statement of facts, as illustrative of the doctrine which has been advanced in the text.

"There are grounds of belief, that even the concentration of the miasms of putrid animal substances, does not give rise to fever, and seldom, if ever, to disease of any description. The following facts certainly militate against a contrary conclusion.

"1. In the neighbourhood of Bitton, in Gloucestershire, about a mile from Willsbridge, which was my residence for nearly four years, there is what is called, 'a bone manufactory,' in which animal bones, after the extraction of their medullary oil by boiling, are distilled, and yield the usual products, muriate of ammonia and sulphate of soda. From this manufactory, a fœtor of the most offensive nauseating nature proceeds, and fills the atmosphere for nearly a mile around, diminishing in strength as it recedes from its source, and in proportion to its dilution or decomposition. The country is thickly inhabited, and near the manufacture itself is the village of Oldland, the population of which is very considerable; yet, in not one instance has this manufacture proved, in the smallest degree, injurious to health. I have frequently visited it with the most complete impunity. For several years the superintendent, Mr. Henderson, his wife, and family, lived in a house, having on one side, connected with it, that in which the retorts are placed, and on the other, that in which the bones are boiled:—yet they had every appearance of health, and they assured me they enjoyed it. A more convenient house, on a neighbouring hill, becoming vacant, Mr. Henderson rented it for the accommodation of his family. Soon after they began to reside in it, they lost their health, and were, when I last saw them, much inclined to return to their old and stinking habitation. This exemption from disease in the manufactory of sal ammoniac, &c. has been noticed by Morveau and Chaptal. *Edin. Med. and Surg. Journ.* vol. II. p. 295.

"2. Between Bristol and Hanham, on the banks of the Avon, is Conham, remarkable for nothing but its having been chosen for the site of an extensive manufactory for the conversion of the flesh of dead animals into a substance resembling spermaceti—a project which has been relinquished several years ago. This being also not very distant from Willsbridge, I made a good deal of inquiry into the result, as far as it affected the health of those immediately engaged in the process, and of the inhabitants of its thickly-peopled neighbourhood. The foreman, or superintendant, Richard Bolston, residing now at Jeffries-hill near Hanham, has been my principal informant: and his account was confirmed by that of Mr. Thomas Pearsall, of Willsbridge, and other respectable persons. Bolston was two years employed constantly in this business; and during that time resided in the midst of dead animal bodies, horses, asses, and dogs, many of which were left to pass through the natural process of putrefaction. He had three labourers under him, and he declares that neither himself nor any of these men suffered from a moment's sickness, or, indeed, experienced the smallest inconvenience. Their business was to cut up the carcasses, to strip the muscular flesh from the bones, and to dispose of it first in boxes, perforated for the admission of water, which were afterwards laid in pits filled with water. The entrails, and every part not useful to them, were left to putrefy on the surface. The pits prepared for the animal matter thus disposed were seven feet deep, and four broad and long, and each calculated to contain the flesh of fifty horses, beside asses and dogs. An idea may, therefore, be formed of the immense volume of putrid animal effluvia, enveloping continually the persons of Bolston and the labourers, by being informed that there were six of these pits, and, consequently, three hundred carcasses of horses, and as many of asses and dogs, exhaling, in greater or less abundance, their offensive miasms. Notwithstanding this Bolston declares, that although the stench was offensive in the highest degree, yet he and those with him sustained no injury—and to this the inhabitants of the country around bear ample and angry testimony, both in relation to Bolston and themselves.

"3. Another remarkable fact, well known where the manufactory of refined sugar is extensively carried on—butchers preserve the blood of the slaughtered animals in open tubs, kept in close, small, shut-up houses, sometimes for several weeks, until the quantity required is completed, or until there is a demand from the sugar-bakers for it. It is then, in a putrid state, conveyed through the public streets, in carts or drays, to the sugar-houses, emitting the most offensive effluvia, and extremely annoying to all those who pass it. It is seldom immediately used by the sugar-bakers, but kept by them in casks, in a putrid state, filling the air of the manufactory, and frequently of the vicinity, with its putrid miasms, or what Galen and his followers would call ἂιτια λοιμου γενησομενα, the seeds of pestilence. But what is the result to the workmen, or to the inhabitants of the surrounding houses?—nothing inimical to health. This fact exists constantly in the city of Bristol, where, in general, the streets are extremely narrow, and the houses excessively crowded, and ill ventilated—and yet the harmless nature of these exhalations may be daily verified—I speak from my own observation, and the experience of the most respectable sugar-bakers. In summer it is more remarkable than in winter.

"4. Mr. Newman, surgeon in Stokes Croft, Bristol, a gentleman of great worth and professional skill, procured for me from his friend Mr. Bevington, and his brother Mr. Newman, of Bermondsey in Southwark, the following interesting particulars respecting the leather-dressing business.

"'I have just received your letter of the 20th inst. (January, 1810,) making inquiry respecting putrid, contagious, and low fevers, as affecting the workmen employed by leather-dressers, to which I can give you a pretty clear reply. Our men are generally healthy, and the most so of the labouring poor—many have been in our service and knowledge fifteen and twenty years, and I do not recollect one case of the kind occurring (in our establishment) in London. The first process in dressing is to put the skins into a pit of water to soften them, which is often used two or three times, that is, for two or three parcels, before it is changed, until the stench is intolerable. After this process the skins are struck out over a beam, and hung up, side by side, as close as possible, in a small room excluded from external air, which we term a stove: in this state they remain until they heat and slime, so that we can pull off the wool. The process of putrefaction is here so rapid as to disengage large quantities of volatile ammoniac, affecting the eyes of strangers with tears, and their noses with the most offensive smell. Our men always pull the skins in the stove in cold weather from preference, and are occupied in it a whole day at a time without injury.' Another gentleman, a brother of Mr. Newman's, concerned in the leather-dressing trade, but not in the same house, in Bermondsey, informs him, 'that so far from our workmen being unhealthy, or particularly subject to fevers, the reverse is the fact—the men employed look generally robust and healthy. In a concern in this line of business of fifty years standing, in which fifty men are constantly employed, the men have been uniformly healthy; and in this a circumstance is deserving of notice, viz. the men who work upon the raw skins, from which there is a constant and profuse exhalation of putrid steams, and those employed at the lime and tan-pits are equally healthy.' Mr. Newman, the writer of the above, says there are about sixty leather-dressers' and tanners' yards in Bermondsey, and in them about seven hundred men are constantly employed.

"It may, perhaps, be objected to this account, that the business of leather-dressers, in other countries, had been represented as extremely unhealthy. Hippocrates is supposed to have meant something of this kind as the cause, when he mentions the case of a person, Philiscus, residing near the wall, who died on the 6th day of a malignant fever; (Epidemic. lib. 1. s. 3;) for anciently, and now, indeed, offensive trades of this kind were carried on in the suburbs, παρα το τειχος of cities. This was the case at Rome, beyond the Tiber, and some of the Latin poets have exercised their wit in allusions to it. It is highly probable, however, that the real cause naturally existed in the spot itself set apart for the 'sordidiores artes,' and that what was attributed to them proceeded from the marshy nature of the soil. Certain it is, without recurring to this explanation, we cannot reconcile Mr. Bevington's and Mr. Newman's, two respectable living witnesses, with the testimony of Ramazzini and Mercurialis, Martial and Juvenal, as quoted by him; and there is sufficient evidence that the Transtiberina Regio of Rome, and the Paduano (once, 17th century, male sanus, bestiis quam hominibus aptior) were proverbially unhealthy from their marshes, and that Bermondsey is not. *See Ramazzini, De Morb. Artific. cap. 15.; and Annotat. in Lib. Lud. Cornelii, Veneti de Vit. Sobr. Commodis; and de Virg. Vestal. Valetud. tuend. Dissertat.*[*]

"5. I borrow the following singular fact from the ingenuous and experienced Ramazzini. 'In hac civitate, (Modena,) quæ pro suo ambitu satis populosa est, ideoque domos confertas habet ac præaltas, mos est ut tertio quoque anno in singulis domibus cloacæ expurgentur, quæ per vicos discurrunt. Cùm ergo domi meæ id opus fieret, contemplatus unum ex operariis istis in antro illo Charonæo magnâ anxietate ac sollicitudine opus suum peragentem, miseratus tam improbi laboris, ipsum interrogavi, cur tam sollicité laboraret, et non pacatius id ageret, ne ex nimio labore in multam lassitudinem incideret, tunc miser ex antro illo oculos attollens, meque intuitus: nemo, inquit, nisi expertus, imaginari potest, quanti constet, plus quàm quatuor horis in hoc loco morari, idem enim est cæcus fieri. Rursus ab eodem quæsivi, num in faucibus ardorem ullum persentiant, difficultatem aliquam respirandi patiantur, capitis dolore tententur, num odor ille nares percellat; nauseam pariat; nihil horum respondit ille, neque pars ulla in hoc opere mulctatur, præter oculos.' This account was afterwards confirmed by his observing a number of these people reduced to blindness and beggary. 'Oculis tamen solummodo, bellum tam atrox indicunt fœtidæ exhalationes istæ, ac illos acutissimis spiculis sic feriunt, ut illis vitam, id est lumen, eripiant." Thus, as certain acrid substances seem exclusively to affect different and distinct parts of the body, as cantharides the bladder, the torpedo the nerves—'sic halitus illi ex humanis fæcibus per varios corruptiones gradus trium annorum spatio, talem adsciscant naturam, ut oculos tantùm lacessant, cæteris vero partibus ignoscant.' *(De Morb. Artific.* cap. 13.*)* This fact is no less important than curious, as it tends to show the inconsiderate conclusions of some eminent writers respecting the influence of the exhalations of privies on the health of men. Sir John Pringle often attributes the epidemics of camps to this as a cause; but it is fair to believe that he did so, without allowing himself sufficiently to investigate the subject. The tendency of this fact, too, goes to the overthrow of some of the bold, and, I am inclined to think, hasty, assertions of Dr. Miller, relative to the locality of the cause of the pestilential fever of New-York, in 1805; for what is 'the blast of putrid exhalations from the sewer of Burling-slip' to the 'halitus ex humanis fæcibus per varios corruptiones gradus trium annorum spatio' of Modena? (*See Edinbugh Med. and Surg. Journal*, vol. III. p. 252.) Now, whether the effect of these exhalations is asphyxia at Paris, according to Sauvages, (*Nos. Meth.* vol. I. p. 820.) or amaurosis at Modena, according to Ramazzini, in either case there is ample proof that they cannot be productive of putrid or pestilential fevers."

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[*] My Essay on the Malignant Pestilential Fever may also be consulted with illustrative effect under the article of Martinico, vol. II. p. 120—123.: under St. Lucia, ibid. p. 133.: under Demerara, ibid. p. 200.

"Clavigero, on the authority of Torquemado, says, that at the dedication of the great temple of Mexico, anno 1486, 72,344 human beings, prisoners taken in war for the purpose, were sacrificed to the Mexican gods; and that a petty king, or lord, about the same time, in imitation of his master, the emperor, sacrificed many thousands on a similar occasion. On the erection of the great altar at Mexico, more than 12,000 were offered up:—and the annual average of human creatures thus disposed of, amounted to 20,000, beside a prodigious number of quadrupeds and birds. Notwithstanding this dreadful waste of human blood—and notwithstanding the horrible stench always present in this quarter of Mexico, the diseases, among an immense population, some say six millions in the city alone, were trifling, and proceeded almost altogether from marsh miasmata. The bodies of the victims were precipitated to the bottom of the steps of the altar, there to putrefy; or were sometimes ate by the Mexicans; and a pond of water, situated close to the great temple, was continually tinged by the blood of the sacrifices. (*See History of Mexico*, vol. I. p. 201. 232. 281. 426. *See, also, Herrara, decade* 3. *c.* 16.; *Provost's Voyages, &c.*) The prodigious sacrifice of peace-offerings, made by Solomon at the dedication of the temple of Jerusalem, may be compared, 1 Kings, viii. 63.

"The annals of Dahomy furnish numerous illustrations of the foregoing remark; a nation whose kings delighted in blood, who wanted heads, not slaves, to garnish their palaces continually stained with human gore, and whose 'annual customs' presented to the terrified European many thousand human beings, sacrificed to the manes of their ancestors—a barbarous oblation, founded on the wildest and most savage superstition, denominated by them, 'the watering the graves of the deceased royal family.' There are some remarkable instances of the savage cruelty of these natives of Guinea, given by Governor Dalzel, in his History of Dahomy, in which, if pestilence could be the produce of the putrefaction of animal bodies, we should expect to hear of the most direful pestilential epidemics; but in which no such result is even noticed. 'It being now noon, they sat down to dinner on the ham and fowls they had brought with them; but were so annoyed by flies, they could scarce put a morsel into their mouths, without taking in some of these vermin with it. They little thought whence this nuisance proceeded, else they would have made a much shorter dinner; nor was it till about three o'clock, when, being desired by a messenger from the great captain, to come to the king's gate, that on their way they perceived, with no small degree of disgust and horror, two heaps of dead men's heads, piled up on two large stages, and covered with swarms of their late visiters, the flies. The interpreter told them, 'they were the heads of four thousand of the Whydohs, who had been sacrificed by the Dahomans to their god, about three weeks before, as an acknowledgment of the great conquest they had obtained.' The king of Abomey, Ahadee, lived in a kind of charnel-house, yet was healthy, and seventy years old when he died. Dalzel thus describes this singular palace: 'The author had once an occasion to pass the limits of the courts already described, when King Ahadee was sick, and would see him in his bed-chamber. This was a detached circular room, of about eighteen feet diameter.

It had a thatched conical roof; the walls were of clay, and whitewashed within. There was a small area before it, formed of a wall about three feet high, the top of which was stuck full of human jawbones; and the path leading to the door was paved with human skulls; the area within was also paved with skulls, which, I understood, were those of neighbouring kings, and other persons of eminence and distinction, whom, having taken prisoners in the course of his wars, he had placed there, that he might literally enjoy the savage gratification of trampling on the heads of his enemies." *Edin. Med. and Surg. Journ.* vol. VI.

In another work of Dr. Chisholm, (*See his Letter to Dr. Haygarth*, 8vo. London. 1809.) he has the following important statement on the same subject.

" Among a number of facts to prove that putrefaction and filth did not give rise to the pestilence, I shall select the following. In the year 1781, a gentleman who managed the mercantile concerns of John Brown and Son, of Copenhagen, in St. Croix, received from them a cargo of provisions, which he, in expectation of higher prices, kept in his storehouses, until the stench from them incommoded the neighbourhood, and could be perceived in the street. A complaint was made to the master of police, who ordered the provisions, consisting of beef and pork, to be examined; and they were found in such a putrid state, that upwards of a thousand barrels were ordered instantly to be carried outside of the harbour, and sunk in the sea. No appearance of infection or of sickness of any kind appeared in the house, in the neighbourhood, or among the people employed in transporting the provisions. In the year 1786, I think, a Swedish brig came into the harbour of Christianstaedt, in distress: she had suffered much at sea, was leaky, and in coming in, struck on a reef at the entrance of the harbour, from being unmanageable. She was got off with difficulty, and brought into the carenage to be hove down and repaired. Her cargo, which consisted of coffee in bulk, was in such a state as to be condemned as useless, and thrown on shore, where it rotted and formed a dunghill. This lay for several weeks near the carenage, which was frequented by sailors and people from different nations; and yet, though it was in the hot months, no sickness or infection was occasioned by it. It was finally removed through my remonstrances. Let this important fact, which, indeed, is confirmed by what happens every year on coffee estates in the West Indies, be compared to the singular assignment of the pestilence of 1793, by Dr. Rush, to the effluvia of damaged coffee. How baseless the fabric of his theory! About fifteen years ago a large whale, in a state of putrefaction, was driven on shore at the Estate Longford, in St. Croix. It was in summer, when the crop was over. The proprietor ordered large quantities of the blubber to be cut off, and boiled in his sugar coppers, to supply his numerous concerns with oil, and for sale. The negroes of the adjoining estates, likewise, supplied themselves with it. Yet none of them or of the white inhabitants were affected with any sickness, though the stench from the whale could be perceived at a quarter of a mile distant. To these I may add this general fact, that Danish ships have seldom arrived at St. Croix from Denmark, without having their provisions in a greater or less putrid state; but sickness has never been occasioned thereby." p. 252, 253.

It is also a proof of the innocence of dead animal matter, and of the communication of the plague by a specific secretion from the living body, that the corpses of those who die of plague do not convey the disease.

"It is remarkable," says Mr. Howard, "that when the corpse is cold of a person dead of the plague, it does not infect the air by any noxious exhalations. This is so much believed in Turkey, that the people there are not afraid to handle such corpses. The governor at the French hospital in Smyrna told me, that in the last dreadful plague there, his house was rendered almost intolerable by an offensive scent, (especially if he opened any of those windows which looked towards the great burying ground, where numbers every day where left unburied;) but that it had no effect upon the health either of himself or his family. An opulent merchant in this city likewise told me, that he and his family had felt the same inconvenience, without any bad consequences." *Howard on Lazarettos*, 2d ed. Lond. 4to. page 25.

Rondeletius, as quoted by Sennertus, asserted that he had dissected bodies dead of the plague in presence of many of his pupils with perfect safety. Much interesting information on this subject will be found in the first volume of Dr. Ferriar's Medical Histories and Reflections. Dr. Ferriar remarks,

"It is a general opinion, that pestilential disorders are occasioned by the effluvia of dead bodies, but there is reason to question the truth of this. When plague has appeared, in the neighbourhood of places where many bodies had remained unburied, after general engagements, other causes can be pointed out as more likely to have produced it. But many instances can be produced in which thousands of dead bodies have been left to putrefy on the field of battle, without causing pestilential distempers. This was not unnoticed by the attentive Diemerbroek. "Cadavera, sive hominum,' says he, "sive aliorum animalium putrescentia pestem non generare, docent multæ magnæ strages, in quibus talis cadaverum inhumatorum putrefactio nullas pestes induxit. Anno 1642 in agro Juliacensi, maxima strages facta est, et ad minimum 8000 militum, occisa fuerunt præter majorem adhuc famulorum, rusticorum, aurigarum, puerorum et mulierum numerum, atque equorum copiam innumerabilem; corpora inhumata sub diu computruerunt, nulla tamen pestis insecuta est. Hic in Germania, durantibus his nostri ævi crudelissimis bellis, etiam plurimæ maximæ strages factæ sunt, post multas tamen illarum nulla peste subsequente.' p. 31.) These facts are strengthened by a well-known circumstance, that in no case could the origin of a putrid fever be ever traced to the effluvia of dead bodies in a dissecting room. Nor have fevers been observed to originate, or to rage more severely in houses surrounding church-yards, in the middle of large towns, though the stench of the putrid bodies, over-heaped in such receptacles, is often insufferably offensive."

It has also been stated, that decomposed *vegetable* matter is not, as contended for by many physicians, the cause of yellow fever. The following fact, stated by Dr. John Stewart, of Grenada, abundantly proves that *vegetable* filth has no more agency in the production of that peculiar type of fever than putrid animal substances. "That vegetable and animal matters in a state of putrefaction do produce disease is not to be denied; but that vegetable matter in a state of corruption is, on many occasions, harmless, is evident, from the very offensive heaps of cotton-seed, and the pulpy covering of the coffee-berry, which are daily to be met with in Demerara, without being considered as a cause of fever; nor should this circumstance be omitted, that when fever does prevail, it is at a season when those causes do not act powerfully." *See Observations on the Nature and Treatment of the Malignant or Yellow Fever which prevailed in the island of Grenada, (W. I.) in the years* 1793, 1794, *and* 1795, *in a Letter to David Hosack, from John Stuart, M. D., &c. &c. Amer. Med. and Phil. Register*, vol. III. p. 183.

It may also be remarked as an additional testimony to that stated by Dr. Stewart, to prove that the yellow fever does not derive its origin from decomposed vegetable matter, that whenever that disease has prevailed in the United

States, it has not appeared in the country where such vegetable matter is most abundant; but has been chiefly confined to our largest cities, and those towns which are situated on the seaboard; a fact totally inexplicable upon the principle that the yellow fever is the product of vegetable putrefaction. I am fully aware the opinion has been entertained that this form of fever prevails in the interior of our country, and especially in the vicinity of the lakes; but whoever will consult the statements furnished by physicians residing there, and who have had the best means of obtaining correct information, will find ample refutation of that opinion. *See Frisbre's Sketch of the Medical Topography of the Military Tract of the State of New-York; and Brown's Sketch of the Country watered by the Mohawk River, &c. Amer. Med. and Phil. Register,* vol. IV.; *Needham's Sketch of the Medical Topography of Onondaga, state of New-York. See Barton's Med. and Phys. Journ.* 1*st supplement.*

A distinguished American writer, the late Andrew Ellicot, Esq. has been often triumphantly quoted in support of the assertion that the bilious fevers, the produce of marsh effluvia in every part of our country, are identical with the yellow fever of our cities. But in a conversation with him on this subject a short time previous to his death, and in the presence of one of my fellow-professors, Dr. Francis, he declared to me, that the fevers which he had noticed wanted the more violent symptoms associated with yellow fever. Professor Ellicot remarked that at the time he made the observations in his Journal, he had had very little acquaintance with the malignant yellow fever, as described by Dr. Rush and others; but that, subsequently, he had seen much, both of the pestilential fever of New-York and Philadelphia, and of the lake or marsh fevers in different districts of the United States. He was now convinced that the yellow fever and the fevers of the interior of the country were of an entirely distinct character. See Dr. Francis' communication in the Appendix to the Discourse on improving the Medical Police of the city of New-York, &c. 1820. But the facts are innumerable which show the absurdity of resorting to vegetable or animal putrefaction, as the source of the malignant fever with which the United States have been visited.

When we advert to the condition of the city of New-York anterior to the American revolution, and before any system of police regulations was adopted; to the offensive state of the town during the revolutionary war, when crowded with British troops; to the immense collection of foul materials of every sort in the cellars of the numerous buildings destroyed by the great fire of 1776, during the whole of which period this city enjoyed a total exemption from the pestilential fever, we must be convinced of the limited and incorrect views of those who look no further for the origin of this evil. In like manner, the offensive state of our slips, our wharves, and our market-places, until within a very few years; the putrefactive processes attendant upon our tanneries, morocco, starch, and glue manufactories, slaughter-houses, tallow chandleries, sugar-houses, &c. &c. the filthy and neglected condition of our streets, and we may add, of many of our burial grounds, furnish incontestable evidence that these are innocent when considered as the primary causes of the mortal epidemics which have desolated our cities. The influence of such an impure state of the atmosphere, resulting from these various causes, as a secondary agent in multiplying and diffusing the poison of fever when introduced, has already, I trust, been made sufficiently manifest.

Mr. Howard, in his remarks on the plague, *(see History of Lazarettos*, p. 43.) adverting to the opinions of those who questioned the contagiousness of that disease, asks, "Have not some of our professors sullied their names with such dangerous doctrines? From no other cause," he continues, "than the error of physicians, who continually maintained that the disease, then epidemic, was not contagious, happened that terrible visitation which, in 1743, ravaged the city of Messina and its vicinity, with the loss of above forty-three thousand individuals, in the short space of only three months."

In the correctness of the observation, "that the material of contagion itself is not constituted by putrid animal or vegetable matters," I am also confirmed by the observations of our health officer, Dr. Joseph Bayley, who informs me, that upon several occasions he has witnessed the arrival, at the Quarantine, of vessels coming from sickly ports, and conveying disease, yet in all other respects in a perfectly clean condition; and on the other hand, that vessels laden with some thousand hides and many hundred bags of coffee, in the most offensive and putrid state, have frequently arrived with a healthy crew; nor did they, while at Quarantine, communicate disease to any persons, whose duty or business made it necessary to hold communication with them, or who were occupied in the discharge of the cargo of such vessels. One instance he relates, which fell under his notice, of a vessel in so offensive a condition from the causes mentioned, as to convey the effluvia to the extent of more than half a mile, insomuch that the passengers of a packet boat at the leeward, passing the Quarantine at that distance, were compelled to leave the deck, to avoid the stench with which they were assailed—still no disease was communicated to any person holding intercourse with those vessels: vessels, too, from South America, laden with beef in bulk, and frequently in a very offensive state, are nevertheless in the most healthy condition.

May it not with great propriety be asked, can the physicians of the United States, who shall carefully have reflected upon the facts which have just been stated, and others of a similar nature which might easily be adduced, persist in the belief they have expressed, that the pestilential fever that has appeared in our cities and sea-port towns is the product of decomposed animal and vegetable matter?

Note E. (See page 298.)

The following cases, selected from those referred to in the text, illustrate, in the most satisfactory manner, the specific nature of the contagion of the yellow fever, at the same time that they show that this disease is occasionally communicated from person to person, even in the pure air of the country.

Facts relative to the contagious nature of Yellow Fever, in the pure air of the country. In a letter addressed to David Hosack, M. D. from the right Rev. Dr. Richard Channing Moore.

Staten-Island, October 20, 1806.

Dear Sir,

The discordant opinions which are held by physicians of the first reputation, upon the subject of yellow fever, have prevented me from replying to your letter of January last, lest the information which I may offer should give rise to such observations as would necessarily involve me in a medical controversy. From frequent conversations with my worthy preceptor, the late Mr. Richard Bayley, as well as from the perusal of those tracts which had fallen under my notice, I for many years entertained the opinion, that the yellow fever, which has proved a scourge to our cities, originated exclusively within their enclosures, and was confined to the impurity of their immediate atmosphere.

One of the first circumstances which excited in my mind an impression of the infectious nature of the disease, and which induced an alteration in my views, was the illness and subsequent death of Dr. Wynant and his wife. This gentleman had been called to take the charge of a man from New-York, ill with yellow fever, upon the north side of this island. The doctor, after an examination of the case, judged it expedient to bleed his patient, and while engaged in the performance of that operation, the man was seized with violent puking, and discharged the contents of his stomach upon his physician's clothes.

From the appearance of the matter so discharged, Dr. Wynant expressed his apprehensions with respect to his own safety; he continued, however, his attendance faithfully until the patient expired. A few days after the death of the person alluded to, Dr. Wynant was taken seriously ill; the usual remedies were applied, from the use of which he imagined himself relieved, and expressed a conviction of his recovery. At this moment he was visited by Dr. Henderson and myself. When we entered his room, which was a fine, airy, comfortable apartment, he declared to us his expectation of being restored in a little time; the danger of the disease he concluded to be completely removed, and he was then in the use of bark and wine. His wife, an amiable woman, was sitting at his bed-side, to all appearance in full health, elated with the prospect of her husband's recovery. She, however, soon discovered that her hopes were premature: the next day the companion of her bosom was wrested from her arms by that fatal disease, the force of which she had flattered herself was subdued.

Upon the day in which the doctor died, which was the 13th of October, '99, Mrs. Wynant was attacked with the same fever which had terminated the life of her husband, and within the space of five days from its commencement she fell a victim to its malignant, deadly influence.

About three years have elapsed since I was called to visit, in consultation with Dr. Halsey, the son of a favourite parishioner, who was ill with yellow fever, which disease he had contracted in the city of New-York. The day preceding the dissolution of the young gentleman in question, it was necessary, in consequence of a copious involuntary discharge of urine, to change the sheets upon his bed, and whilst the disconsolate father raised the body of his son, I supported his drooping head upon my shoulder. The patient died; I performed his funeral rites, and in a few days was attacked with the disease myself. During my confinement and convalescence, I was visited by several of the faculty. Dr. Bainbridge of New-York was at my house, who expressed his conviction of the serious nature of the disease, from which I was then recovering. It must be remembered that I had not been in the city for many weeks, preceding my indisposition, and that the young gentleman from whom I received the complaint was confined in an airy, well-ventilated chamber, surrounded with every comfort which the tenderness and opulence of his parents could procure.

In addition to the instances above mentioned, I have been informed by Mr. Abraham Banker, a gentleman of learning and intelligence, of the death of Mr. Degroat and his wife. It appears that a person from the city of New-York, by the name of Oswald, had engaged lodgings for himself and family at the house of Mr. Degroat, an opulent farmer upon the north side of this island. Mr. Degroat went to the ferry with his wagon to escort the strangers to his house; and upon his return home, rode next to Mr. Oswald, with whom he was engaged in close conversation. A few days after the arrival of Mr. Oswald, Mr. Degroat was seized with the yellow fever, to which he very soon fell a victim. Mrs. Degroat, who had affectionately attended her husband, was also attacked, and after struggling with the disease a few days, she followed her late companion to the tomb. Mr. Oswald, from whom, Mr. Banker is convinced, the contagious effects of the disease were received, added another to the list of mortality in that family; so that in the space of ten or twelve days, from the arrival of these fugitives from the city, the house was swept of three of its inhabitants.

In the preceding narrative, I have related such facts as have occurred in the circle of a few miles, and I leave you at full liberty to make such use of them as you may deem expedient for the public good. To resist the force of truth cannot be the object of any individual of the faculty of medicine: the learning and the talents of our medical brethren must render them superior to every sinister consideration; and I feel persuaded that their united wish is to advance the health and happiness of their fellow-creatures, and to diffuse a light upon a subject, of which, to say the least, the views of physicians are extremely imperfect.

Accept, dear Sir, the assurances of my regard, with which my mind is impressed toward you, and believe me to be your friend and humble servant,

RICHARD CHANNING MOORE.

DR. D. HOSACK.

Statement of Facts tending to prove the contagious nature of the Yellow Fever, at Germantown, in the year 1798, *by C. Wistar, M. D. Professor of Anatomy in the University of Pennsylvania, &c.*

The disease which produced the fatal effects now to be related, commenced in the family of Elizabeth Johnson, a widow who lived in the main street of the village of Germantown, about six and a half miles from Philadelphia.

The person first affected was her child, Betsey Johnson, who had been in Philadelphia from the third to the seventh of August, in a neighbourhood where several cases of the fever had already appeared. She returned home the seventh, and on the 9th of the same month was attacked with the yellow fever, which terminated fatally in four days.

Fourteen days after her death, viz. August 27th, Mrs. Duy, the next neighbour of Mrs. Johnson, who had visited Betsey several times during her illness, was attacked with a fever supposed to be of the same kind, and died at the end of four days.

On the thirtieth of August, the wife of Charles Hubbs, who also lived near to Mrs. Johnson, and had visited both Betsey and Mrs. Duy, once at least during their respective indispositions, but had not been in Philadelphia for many months, was attacked with unequivocal symptoms of the yellow fever, in its most malignant form, and died the 2d of September.

Mr. Duy, husband of the above-mentioned Mrs. Duy, was attacked sixteen days after the death of his wife, viz. September 18, and died also, after an illness of six days.

A few days after the death of Mrs. Duy, an English gentleman and his wife, of the name of Fisher, who had fled from Philadelphia on account of the fever, went to board with Mr. Duy, and were placed in the chamber occupied by his late wife during her illness: they were also attacked with fever. Mrs. Fisher was taken, September 19th, and recovered in a few days, but Mr. Fisher, who was attacked four days after his wife, died with the black vomit, the 27th of September.

At the same time, the disease re-appeared in Mrs. Johnson's family, in a young female servant, who was very ill, but recovered. Soon after the attack of this girl, Mrs. Johnson herself was taken ill with the same disease: she had visited both of her neighbours, Mrs. Duy and Mrs. Hubbs, while they were sick, she also had assorted the clothes of her deceased daughter, four or five days before her own attack commenced, but had not been in Philadelphia for a month. Her disorder continued eight days, and terminated the 28th of September, with convulsions and the black vomit.

A few days before the death of Mrs. Johnson, Elizabeth Stern, a woman who lived in the family, was attacked with fever, and became very yellow. Her symptoms appeared moderate at first, but after lingering a fortnight, she also died.—The wife of a tenant of Mrs. Johnson, who lived in a separate part of the house, but used the same yard, was attacked before the death of Elizabeth Stern, and recovered with great difficulty.

The last victim to be mentioned, was one Stephen Post, an old man, who lived at a distance, but worked in Mr. Duy's barn, while the bed was there on which Mrs. Duy died. He was also attacked with fever, and died in a few days.

These melancholy circumstances occurred in a village which has long been remarkable for its salubrity, at a time when the other inhabitants enjoyed their usual health. In most of the cases, the disease appears to have been contracted at the house of Mrs. Johnson, which before this distressing period, had been eminently distinguished by the health and longevity of its inhabitants. The family were extremely neat; and it may be asserted with confidence, that the premises were never more clean than they were at the time of this truly affecting catastrophe. What cause but contagion is adequate to the production of such a disease among persons so situated?

Philadelphia, Dec. 15, 1805.

Note F. (See page 301.)

The following statement fully illustrates the principle, that those who are accustomed to breathe an impure air frequently escape disease, while those who from their better condition in life enjoy the more pure atmosphere, are readily attacked with contagious fever when exposed to its exciting cause.

"The most pernicious infection," says Lord Bacon, "next the plague, is the smell of the jail, when the prisoners have been long, and close, and nastily kept; whereof we have had in our time experience twice or thrice, when both the judges that sat upon the jail, and numbers of those who attended the business, or were present, sickened upon it and died. Therefore, it were good wisdom that in such cases the jail were aired before they be brought forth." *Nat. Hist.* exp. DCCCCXIV.

In Stowe's Chronicle a more particular account is given of the same circumstances, as occurring at the fatal assizes held in the year 1577, in the following words: "On the 4th, 5th, and 6th days of July were the assizes held at Oxon, where was arraigned and condemned Rowland Jenkins for a seditious tongue; at which time there arose amidst the people such a damp, that almost all were smothered. Very few escaped that were not taken. Here died in Oxon three hundred persons; and sickened there, but died in other places, two hundred and odd." "Of the same kind of infection," says Sir John Pringle, "we have an unhappy instance so fresh in our memory, that I needed not to have mentioned it here, had it not been for such as live at a distance, or those who are to come after us. In the year 1750, on the 11th of May, the sessions began at the Old Bailey, and continued for some days; in which time there were more criminals tried, and a greater multitude was present in the court, than usual. The hall in the Old Bailey was a room of only about thirty feet square." "The bench consisted of six persons, viz. the lord mayor, three of the judges, one of the aldermen, and the recorder, whereof four died, together with two or three of the counsel, one of the under-sheriffs, several of the Middlesex jury, and others present, to the amount of above forty; without making allowance for those of a lower rank, whose death may not have been heard of; and without including any that did not sicken within a fortnight after the sessions."

Similar instances of infection are related to have taken place at the Black assizes, at Taunton, and at those of Exeter, in 1586. *See Ree's Cyclopædia*, art. *Contagion.*

Facts of a like nature have fallen under the notice of that accurate observer, Sir Gilbert Blane. An extract from his letter on this subject is here inserted.

Extract of a Letter from Sir Gilbert Blane, M. D. &c. to the Hon. Rufus King, Esq. Minister at the Court of St. James from the United States of America, dated

London, 26th November, 1798.

SIR,

I sit down to perform the promise I made you this morning, of putting on paper some remarks on the nature of the yellow fever and the means of preventing it.

In doing this I shall chiefly confine myself to those views of it in which the magistrate is concerned. The adopting of measures for the prevention of disease is one of the most important duties of a wise and patriotic government; and the discovery of these means, as well as the efficiency of the steps to be taken, must depend on a thorough knowledge of the causes by which it is excited and influenced. My opportunities upon actual service in the West Indies in the late war, when physician to the fleet under the command of Lord

Rodney and Admiral Pigot, and my present official duty as a member of the Medical Board of the Navy, have necessarily brought to my knowledge a number of facts relating to this subject, and I shall be extremely happy if the communication of some of the most important of them can throw any light, which may prove useful to the American government in checking an evil so afflicting and calamitous.

The first question that occurs with a view to preventive measures is, whether this disease be infectious, and under what circumstances it is so?

In those situations in which I observed it in the West Indies it was evidently so. There was the most incontestible evidence of this, both on board of ships and at hospitals, and the doubts which have been started on this point, seem to have arisen from the operation of infection being blended with that of other causes, which must concur with it in order to give it effect.

But whatever doubts there may be on this subject in the West Indies, there can be none in the climate of North America. This will be best proved and illustrated by an example.

On the 16th of May, 1795, the Thetis and Hussar frigates captured two French armed ships from Guadaloupe on the coast of America. One of these had the yellow fever on board, and out of fourteen men sent from the Hussar to take care of her, nine died of this fever before she reached Halifax on the 28th of the same month, and the five others were sent to the hospital sick of the same distemper. Part of the prisoners were removed on board of the Hussar, and though care was taken to select those seemingly in perfect health, the disease spread rapidly in that ship, so that near one-third of the whole crew was more or less affected by it.

This fact carries a conviction of the reality of infection, as irresistible as volumes of argument; and it further affords matter of important and instructive information, by proving that the infection may be conveyed by the persons or clothes of men in health.—*Blane's Diseases of Seamen*, p. 605—607. 3d edit.

The principle which we have endeavoured to illustrate relative to the operation of febrile infection upon individuals unaccustomed to its influence has, in several instances, been strikingly exemplified by circumstances which have occurred in the debtor's prison, and in the bridewell of New-York. The following memorandum, made at my request by Dr. J. W. Francis, is in point on this subject.

" In the month of September, 1811, a febrile disorder of the typhoid character made its appearance in the debtor's prison of this city: its origin was owing to causes similar to those which usually produce a vitiated state of the atmosphere in confined apartments, the want of pure air, and the crowding of a large number of persons together, &c. &c. The contagion thus engendered was observed to operate with peculiar severity upon those individuals who were suddenly introduced into this vitiated air. About the 16th of July, 1814, several cases of the *typhus carcerum* occurred in the bridewell of New-York. The disease was first observed to exist in an apartment of the institution commonly called the eastern wing, a room about fifty feet long and twenty-five broad. Within a very few days after, the complaint became more general; and out of eighty-five individuals at that time confined in this part of the building, nearly forty were taken ill with symptoms characteristic of typhoid fever. The disease, in this instance, as in the former, was produced from the local circumstances of the place; the crowded condition of the ward, the want of cleanliness about the persons and in the clothing of the prisoners, and the neglect of free ventilation. The increased impurities of the atmosphere of the apartment seemed to give additional activity to the viru'ence of the disease: of the persons thus affected a large majority were those who had come from a pure air, and were but recently subjected to the noxious air of the place, several not more than thirty or forty hours, and many not more than three or four days. The infection was more readily communicated to those, too, who were naturally possessed of vigorous and robust constitutions, and its effects were, in most cases, more violent upon persons of this description than upon others. That the sphere of the infection was confined within certain limits, as affirmed by Dr. Lind of the malignant fever at the naval hospital at Haslar, and lately most satisfactorily shown by induction from well-attested facts concerning typhoid infection in general, *(see Letter of Dr. Haygarth to Dr. Percival,)* was abundantly manifest from the healthy condition of the prisoners in other apartments of the bridewell. The progress of the disease, which I have thus briefly noticed, was arrested by the removal of the sick, and the materials impregnated with the morbific poison; by the introduction of pure air, by ablution, and by other means now most generally had recourse to for the purification of fever-wards and houses of recovery, as recommended by Dr. Ferriar.

"It has again and again been observed, by the keepers of our prisons, that those criminals who have long been accustomed to breathe the vitiated air of the crowded apartments of these institutions very frequently escape febrile contagion: the poison itself might, at first view, appear to have lost a portion of its virulence; but it has with more propriety been maintained that the individuals thus inured to its influence are, from habit, exposed to it with impunity; while, on the other hand, the reverse is the case with the unassimilated, when subjected to the operation of an impure air, deriving its noxious properties from concentrated human effluvia. It is a remark of most writers, that the infection of typhus, whether occurring in jails, ships, or elsewhere.

becomes concentrated, and, consequently, more active by the cold of winter. This opinion is strengthened by the well-known fact, that a greater number of deaths takes place from fevers of this nature, in our prisons, during the winter than in the summer season."

Note G. (See page 305.)

I have expressed the belief that the changes which the atmosphere undergoes during the prevalence of certain pestilential disorders are ascribable to a fermentative or assimilating process. I am strengthened in this opinion, which I have for many years maintained, by the recent and elaborate investigations of MM. Gay Lussac, De Saussure, and other distinguished chemists, which have thrown much light upon the subject of fermentation, and also by some interesting observations lately published in the Edinburgh Review. *See Edinburgh Review for April*, 1814.

For a perspicuous elucidation of the manner in which the poison of diseases of specific contagion operates upon the human constitution, in assimilating the mass of fluids to its own peculiar nature, the reader may consult an Essay lately published by Dr. J. W. Francis, Professor of Materia Medica in the University of the State of New-York, and inserted in the American Medical and Philosophical Register, (vol. IV. p. 474—519 :) also a valuable Dissertation on the Pathology of the Human Fluids, by Dr. Dyckman of New-York.

This assimilating process, I perceive is also adopted by Dr. Good in his late elaborate and very learned work, his "Study of Medicine." "All, he says, concur in evincing the existence of morbid and specific poisons in the blood, acting the part of animal ferments, converting the different fluids into their own nature, exciting the commotion of fever, and being eliminated on the surface, as the best and most salutary outlet to which they can be carried by the very fever which they thus excite."*

Note H. (See page 307.)

There is scarcely to be found on record a series of facts which so conclusively prove the specific character of the pestilential or yellow fever, or points out the circumstances under which it is propagated or extinguished, as those referred to in the text: *e. g.* we have seen this disease introduced at the Wallabout on Long-Island in the summer of 1804, and the poison diffusing itself in that neighbourhood as far as the impurity of the air extended; while the same disease conveyed, from the Wallabout into the city of New-York, was instantly extinguished by means of the relative purity of the atmosphere, the effect of the rigid system of police then observed. *See American Med. and Phil. Register*, vol. II.

In like manner, in the summer of 1809, *(see Statement by Dr. Gillespie, Amer. Med. and Phil. Register*, vol. I.) the yellow fever was introduced and spread in the village of Brooklyn, Long-Island; at the same time that the city of New-York, within eight hundred yards' distance, enjoyed the most perfect exemption from it; a fact which at once disproves the dependence of yellow fever upon a general constitution of atmosphere which many physicians believe to be necessary both for the origin and propagation of this form of fever. We are led to the same conclusion by a perusal of the report relative to the introduction of the yellow fever into the city of Amboy, New-Jersey, in the summer of 1811. *See Amer. Med. and Phil. Register*, vol. III.

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* See Study of Medicine, by John Mason Good, M. D. F. R. S. vol. II. p. 546, 7. Lond. ed.

NOTE I. (See page 307.)

The following extract of a letter from the Rev. Dr. Samuel S. Smith, the late president of Princeton College, shows that the fact I have stated of an interval taking place between the first and subsequent cases of fevers is of so frequent occurrence, that it even attracts the notice of those who are unconnected with the medical profession.

Princeton, July 24th, 1808.

DEAR SIR,

I have not any doubt, but that yellow fever contains a specific contagion, essentially variant from that of small-pox, with which it has so often been compared in order to deny contagion being incident to it. It requires a certain putrid state of the atmosphere as a conductor, in order to impart it; and it may inoculate and assimilate any confined portion of atmosphere which has been exposed to the requisite causes of contamination, so that every part of it shall have power to communicate the poison. In the pure atmosphere of the country the poison is commonly so diluted, that it is too weak to excite the fever, except under peculiar circumstances.

In every instance in which yellow fever has been introduced into Philadelphia, one circumstance has invariably taken place: after the persons who have first taken the disease have either died or recovered, there has been an interval of health for several days, usually from ten to thirteen or fourteen, before the alarm has been renewed. From this circumstance I have concluded, that during that space of time the infection secretly works in the blood before it appears in fever. Often there is a second interval of apparent health, but not of so long a continuance. I hope that your view of the subject will carry more conviction with it than we have hitherto perceived; and I hope it will even contribute, among the more sensible part of the profession, who do not think merely by authority, to unite jarring opinions and to settle common principles.

SAMUEL S. SMITH.

By physicians who have recorded our epidemics, such interval has been repeatedly observed. In Dr. Caldwell's Essay on the Yellow Fever of Philadelphia of 1805, the same fact is very circumstantially noticed.

Note K. (See page 310.)

In the official document of the Board of Health of New-York, published on the 14th of September, 1805, they thus addressed the inhabitants of this city: "The board have formed a decided opinion, that the principal seat of the prevailing disease [the malignant epidemic fever] is that part of the city included between Burling-slip and Old-slip as far west as Pearl-street. Almost all the cases of disease which have occurred, can be distinctly traced to a communication with that part of the city. It is a matter of extreme regret, that the repeated admonitions of the board, to remove from this quarter, have been disregarded by a number of individuals who have remained the self-devoted victims of disease and death. They conceive it their duty again to enjoin it upon their fellow-citizens, who have continued there, to remove immediately." Again, and in the same address: "All persons who do not comply forthwith with this advice of the board, to remove from the above described part of the city, which is deemed the principal seat of the disease, and which does not contain more than thirty-three acres, will be considered guilty of a wanton exposure of their lives, and will justify the board in resorting to compulsory measures." The epidemic fever which prevailed in Philadelphia in 1793, spread in a similar manner, according to Dr. Rush and others. "For awhile," says Dr. Rush, "this fever was confined to the above-mentioned part of the city, but the disorder is spreading, and now appears in other places, so that several are affected in other parts of Water-street; some in Second-street; some in Vine-street; some in Carter's-alley; some in other streets; but, in most cases, the contagion can be traced to Water-street." Proofs of the same kind might be taken from the most authentic accounts of the yellow fever as it has prevailed at other seasons, and in other cities and sea-ports of the United States: proofs wholly irreconcilable with the assertions of those who have declared that the malignant yellow fever arises at "distant and unconnected points; that "no relation is observed between the source of the supposed contagion and the spreading of the disease to individuals or families," and who have maintained that there "never was any successful attempt to trace, in irregular series, the propagation of it to any number of persons from the first case, or from any single point of infection." *See Rush's Account of the Bilious Remitting Yellow Fever as it appeared in Philadelphia in* 1793; *Account of the Yellow Fever of New-London in* 1798; *Hardie on the Malignant Fever of New-York in* 1805; *Chisholm's Letter to Haygarth; Official Documents published by the Board of Health of New-York; Amer. Med. and Phil. Register, &c. &c.*

NOTE L. (See page 311.)

Hints on Purifying the Air of Infected Apartments, by the late Dr. T. Garnett, Professor in the Royal Institutions, &c.

"If the air contained in a phial, be rendered offensive by putrid animal and vegetable substances, it may almost instantly be made sweet by dropping into the phial a few drops of oxygenated muriatic acid; or more effectually still, by introducing into it a small quantity of oxygenated muriatic gas.

"This experiment may be easily made; and it will be found that the air will, in this way, be deprived of the most putrid taint possible. Morveau and Berthollet have found, that if oxygenated muriatic gas be disengaged in a dissecting room, the bad smell from the subject will be corrected for a time; and that if the subject be washed with oxygenated muriatic acid, it will exhale no bad smell for a considerable time. These curious, but well-ascertained facts, naturally lead us to inquire into the action of the oxygenated muriatic acid, in correcting the putrid effluvia.

"It is now well known, that almost all the putrid smells disengaged by putrefying substances, are owing to the extrication of inflammable air, or hydrogen gas, loaded with some or all of the three following substances, sulphur, phosphorus, or ammonia; and these substances do not give out any very disagreeable smell, except when dissolved in hydrogen gas; but in that state we know the smell to be very unpleasant.

"Sulphurated hydrogen gas, or hepatic air, smells very disagreeably; but the hydrogen gas in which phosphorus has been dissolved, often smells most intolerably, resembling the refuse of blubber. The superabundant oxygen of the muriatic acid, unites with the hydrogen, and forms water; and the sulphur and phosphorus being no longer in a state of solution, become concrete, and the bad smell disappears.

"Though it is not yet proved, it seems very likely, from the experiments of Mr. Wall, and others, that the effluvia from the human body communicating infection, is hydrogen gas, charged with some animal substances.

"Is it not natural, from analogy, to conclude, that if these were deprived of their solubility in hydrogen gas, they would become innocent? and may we not reasonably suppose, that the oxygenated muriatic gas will deprive them, as well as other putrid effluvia, of their solubility?

"It certainly, I think, deserves a trial, which may be made at a very small expense, in the following manner.

"Take an ounce of the black oxyd of manganese in powder, and mix with it a quarter of a pound of common salt; put this mixture into an earthen vessel, and place it upon a chafing dish of coals in the room where the person labours under an infectious complaint; then pour upon it two ounces of sulphuric (vitriolic) acid, diluted with the same quantity of water.

"Oxygenated muriatic acid gas will be instantly disengaged, and perceived in all parts of the room, and will at least destroy any putrid or offensive smell; and I am inclined to hope, that it will likewise correct the contagious effluvia.

"When this gas is extricated in too great quantity, it will excite a cough; but I think that will not be the case with the quantity I have mentioned; if it should, a less portion must be used, or the mixture may be made without heat; but we know that bleachers are continually inhaling this gas in considerable quantity, without any disagreeable consequences. I should think there could be no difficulty in doing it in the house of any poor person; but it certainly might be very easily done in a fever-ward."

As connected with the same subject, and illustrative of the condition of atmosphere produced by the introduction of an infectious ferment, and the means of destroying the noxious compound, I subjoin the following valuable communication from Samuel Bard, M.D., LL.D. the late venerable and learned President of the College of Physicians and Surgeons, in the University of the State of New-York.

Hyde-Park, July 27, 1808.

My Dear Sir,

I have read, with great pleasure, your lucid arrangement and explanation of contagious diseases, and am, by your arguments, confirmed in the opinion I have always entertained of the agency of a ferment, sui generis, in the propagation of contagious and infectious diseases. I use these terms here indiscriminately: indeed, I believe the analogy between fermentation and its various products, and the progress and fomes of contagious distempers, applies more closely, and to a greater extent, than has been generally supposed.

For instance; under certain circumstances of heat and moisture, all vegetable and animal matters run into fermentation; that of vegetables passes through the stages of vinous and acetous to a species of putrefactive; that of animals likewise has its stages, as is evident in the fermentation of milk; and its products differ conspicuously according as flesh, fish, fat, blood, or eggs are the subjects of it.

An increased degree of heat always increases the rapidity with which fermentation goes on; and other circumstances of the atmosphere, a greater or less degree of moisture and dryness, a violent storm, thunder and lightning, moonlight, and probably many other less evident causes combining with the heat, variously change, hasten, or retard the process of fermentation, as every person conversant with these subjects well knows.

Again, the different constitutions, (or, if you please, a certain predisposition in vegetable and animal substances,) have the same effect in hastening, retarding, and variously modifying the products of fermentation: thus rich vegetable juices readily assume, and stop at, the vinous stage, and with difficulty can be made to go on to the acetous; poor and crude vegetable juices can hardly be arrested at the vinous stage, but run rapidly into the acetous; and cabbages, and all vegetables of that class, can hardly be made to produce either wine or vinegar, but quickly run into a kind of putrefactive fermentation. Fish putrefies more readily than flesh; and there is a great difference in this respect between the flesh of different animals.

All these circumstances are hastened, rendered more certain, and variously modified, by the addition of a ferment; and, lastly, a certain degree of cold prevents all fermentation, and stops it where it has already begun. So it is with infectious epidemics; certain degrees of heat and moisture in the atmosphere are necessary to their production; high degrees of heat always increase the spread, and add to the malignancy of the disease; filth, and other qualities of the atmosphere less known, vary their types and exalt their grades; the constitution of the patient renders him more or less susceptible of particular diseases; the addition of a ferment (which is found wherever the disease exists) most certainly communicates and characterizes it; and lastly, under certain circumstances of purity and temperature of the atmosphere, it is found almost impossible to propagate those diseases, even by the aid of a ferment; and this observation applies, in some measure even to small pox, measles, &c.

The sentiment, therefore, which you express, and so well illustrate, that the contagious diseases of your third class, in which intermitting and remitting fevers may be included, although they may originate in circumstances of heat.

moisture, and filth, and some other less evident qualities of the atmosphere, yet are unquestionably, and with more certainty, produced and propagated by the introduction of a ferment characterizing the type and grade of the disease, is, I believe, strictly and literally true; and upon this opinion only can a well-regulated police and quarantine laws be founded. The question you ask, why A after visiting B, ill of dysentery, plague, yellow fever, &c. is seized with the identical disease of B, when you consider the universality of the fact, is decisive as to the existence of a peculiar virus, or fomes sui generis, producing that particular form of disease; and the observation of Sydenham, that the prevailing epidemic swallows up all other diseases, confirms it; and I think you treat the non-contagionists with too much lenity, when you say they differ from us only in terms: far from it; they differ in fact, and most dangerously so; for, by denying the generation of a peculiar ferment in and about the bodies of the sick, and the propagation of contagion from patient to patient, they deny the utility, and are led to the neglect of some of the most important precautions against the introduction, importation, and propagation of such diseases.

Your first class of contagious diseases is strictly and clearly defined; they can be communicated by contact only: is not the materies morbi of these diseases always generated within the body; and whether it consists of animalcula, or a chemical combination, are they to be found any where else?

The fact that the diseases of the second class are communicable at every season of the year, during the heat of summer as well as during the severest cold of winter, in a pure as well as an impure atmosphere, forms the best distinction between this class and the third. But in as far as it is true that none of the second class can be suffered more than once in a lifetime, I am almost led to conclude, that in these, too, the materies morbi can be generated only in the bodies of the sick: the first origin of these diseases, and their occasional re-appearance in places where they had not been seen for years before, I confess forms a difficulty, but I do not think a contradiction to this opinion; the materies morbi in these seems to be of a grosser nature, not so readily assuming a very elastic æriform state as that of the diseases of the third class; and hence the circle of contagion is much more restricted near the bodies of the sick.

Of the third class the fomes may certainly be, and probably always is, in the first place generated in the atmosphere, and for that reason requires particular circumstances of heat, moisture, &c. but finding materials in the bodies of the sick to act upon, it readily assimilates a large portion to its own nature, which being very elastic and æriform, spreads to a wider extent, and contaminates the atmosphere, particularly a foul atmosphere, in which similar ingredients are found to a great extent.

Yours sincerely,

Dr. Hosack. SAMUEL BARD.

Though my observations on fever and febrile contagion have already extended to a greater length than I anticipated, yet I am induced to add the following extracts of a letter from Dr. Francis, the then Professor of the Institutes of Medicine in the University of the State of New-York, communicated to me during his residence in London in 1816. It is interesting on many accounts, but chiefly as making known the important decisions of two of the most learned and distinguished medical bodies of Europe on this momentous subject.

London, June 16, 1816.

DEAR SIR,

Within a few days I set out for Bristol, and in all probability this is the last letter you will receive from me dated London. The present communication might be devoted to many interesting subjects, medical and philosophical; but I am induced from many considerations to restrict my attention particularly to one. You have long been acquainted with the important controversies that have existed on that grand subject of medical disputation, contagion; with the various and contradictory opinions that have been promulgated as to its nature and effects; and with the manner in which those controversies have been conducted, especially by American physicians. The question of contagion and infection has also occupied, as you well know, a large share of the attention of the Medical writers of Great Britain, especially within the last few years. Much less diversity of sentiment, however, exists in this country than in our own, and in the discussion much less of asperity has been manifested. A single exception occurs in the case of Dr. Bancroft in his late "Essay on the Disease called Yellow Fever:" a work intended by the author to prove that this form of fever is occasioned by the operation of marsh miasmata, and is noncontagious; and of which performance it is due to the talents of the author to admit that he has displayed great learning and research. As one practically acquainted with the disease during its visitations in America for a period of more than twenty years, your own ample experience will have enabled you at once to perceive the fallacy of such speculations. Indeed, the volume of Dr. Bancroft has most materially aided in the establishment of the very doctrines which it was his object to overturn. Few writers seem to have entered the field of controversy with stronger prejudices, and perhaps none have communicated their thoughts with less deference to authority, and in more illiberal language. It would appear to be the opinion of Dr. Bancroft, judging from his conduct, that gross invective and personal abuse may supply the place of well authenticated fact and legitimate deduction.

The revival in England of the controversy relative to the specific form and contagious nature of yellow fever has been the means of giving birth to several works of great practical value, and in my opinion of deciding the great question, if indeed any thing had been wanting after the laborious investigations of yourself and of other American physicians. The volumes of Sir James Fellowes and Dr. Pym have just made their appearance here, and may not yet have reached you. The former author has published the results of his practice under the title of *Reports of the Pestilential Disorder of Andalusia, which appeared at Cadiz in the years* 1800, 1804, 1810, *and* 1813; *with a detailed Account of that fatal Epidemic as it prevailed at Gibraltar during the autumnal months of* 1804, *&c.*: the latter under the name of *Observations upon the Bulam Fever which has of late years prevailed in the West Indies, on the Coast of America, at Gibraltar, Cadiz, and other parts of Spain; with a Collection of Facts proving it to be a highly Contagious Disease.* As officers of high trust in the medical department of the Army, they have enjoyed opportunities of unwonted observation: the manner in which they have drawn up the respective accounts of their labours is highly satisfactory, and the accuracy of each work is fully confirmed by official documents. Sir James Fellowes, as long ago as 1795, had numerous opportunities of witnessing the pestilential fever which committed such ravages among the British soldiery of St. Domingo, and he describes the peninsular fever as appearing under a similar form of malignity, and showing many of the strongly marked characters of the St. Domingo fever. His history of the origin and progress of the disease clearly points out that there is a real foundation for the distinction between fevers arising directly from the miasmata of marshes and decomposed vegetable matter, and those that are the offspring of human effluvia, or specific contagion. The account furnished by Dr. Bancroft under this head is clearly proved to be erroneous, and his statements, deficient as they are in the most essential requisites, will have little weight when compared with the judicious relation of the Spanish Professor Arejula. In his observations on the disorder called the Walcheren fever, which prevailed so fatally among the troops of Zealand in 1809, and after their return to Great Britain, Sir James maintains that it possessed no contagious property, at least no evidence existed that the complaint ever had been propagated or communicated to those in attendance upon the sick. "This fact," says he, "was confirmed by my own experience, and by the testimony of al the medical officers of the army." "On the other hand,' adds Sir James, "the numerous facts which have been recorded of the contagious nature of the pestilential fever of Spain are incontrovertible; they are detailed with simplicity and truth, and they must speak for themselves."

Dr. Pym, in his Observations, has attempted to prove that the fever of Gibraltar was the same as the Bulam fever, so happily described by the learned and distinguished Chisholm; that it is a disease totally distinct from the bilious remittent fever of warm climes; that it has no connexion with or relation to marsh miasmata; that it appears in the West Indies only under peculiar circumstances; that it is contagious, and under a certain degree of temperature may be propagated from one country to another; that it attacks in a comparatively mild form, natives of a warm climate or Europeans whose constitutions have been assimilated to a warm climate; and that it differs from all other fevers in having its contagious powers increased by heat, and destroyed by cold, or even by a free circulation of moderate-ly cool air. According to Dr. Pym, under the name yellow fever, have been confounded three fevers, which he considers as totally distinct. The agency of marsh effluvia, I have already observed, he wholly rejects as a cause of the Bulam, Gibraltar, or real yellow fever. This you will perceive is striking at the root of that most pernicious error that has been so zealously and so widely propagated, notwithstanding the evidence of facts to the contrary, and the happy nosological distinctions made long since by such authors as Blane, Chisholm, Jackson, Lempriere, Clark of Dominica, Stewart, Bard, and numerous other practical observers of undoubted veracity. For I believe you will agree with me that from the want of a due discrimination on the part of many writers who have professed to describe the fevers of the United States, as they have prevailed in our seaport towns and in different inland places of our country, have proceeded most of the dissentions that have existed on this subject. This want of discrimination too may justly be considered adequate to the production of many of the histories of the diseases of America that have appeared, and in which we find confounded fevers arising from dissimilar causes, characterized by different train of symptoms, and varying most essentially in the methods of treatment they require. Dr. Pym's is no feeble attempt to counteract the influence which the unwarrantable opinions of Dr. Bancroft may have had in relation to this point.

But I have to solicit your attention to a much more important circumstance made known in the volumes of Dr. Pym and Sir James Fellowes, and to communicate which this letter has been written. Dr. Pym, who had the advantage of seeing the disease not only in Europe but in the West Indies, contends, that the Bulam fever attacks the human frame but once; and supports this position with the strongest proof. I will not do injustice to his statements by attempting to abridge them. Irrefragable evidence is advanced by Dr. Pym, that the Gibraltar, West India or Bulam fever, are the same disease. In a subsequent essay, Dr. Pym has enlarged on the subject of the disease affecting the human body but once.

This same peculiarity marked the pestilential fever of Spain. According to Sir James Fellowes, it never has been known to attack the same person a second time in that country. "This fact," says Sir James, "which was first observed by the native practitioners, has now been confirmed by the experience of several years, and by the concurrent testimony of all the surviving inhabitants of those places where the disorder had most prevailed." *Introduction*, p. xxiii.

I have dwelt so long on the performances of Sir James Fellowes and Dr. Pym, as almost to be deterred from referring to any other authority; yet I cannot forbear making a short extract from an account of the epidemic fever which occurred at Gibraltar, and for which the public are indebted principally to Dr. Gilpin, one of the inspectors of the hospitals. The paper throughout is of singular merit, and eminently calculated to do away the doubts of the sceptical, and strengthen the faith of the wavering. It is gratifying to the philanthropist to read the answer given by Dr. Gilpin to the eighteenth query, addressed him by the Medical Board of the army.

"At the commencement of the disease," replies Dr. G. "last year, it was calculated that there were about five thousand persons within the walls who had previously passed through it; and, after careful inquiry, there does not appear to be one well authenticated case of a person's having received the infection a second time. I heard, indeed, of three or four; but as the nature of the previous fever could not be exactly known, these exceptions have but little weight in so momentous a question. The exemption from a second attack. I am credibly informed, is firmly believed in Spain. At Cadiz, last year, though the fever put on the very worst symptoms, and destroyed the patient frequently in forty-eight hours, the deaths did not exceed, in a population of upwards of seventy thousand, fifty a day ; and these were chiefly strangers. The Spaniards are so fully convinced they cannot receive the infection a second time, that having passed the disease is matter of great rejoicing among them : and a medical certificate of the fact, is a sufficient passport into an infected town, which they enter without the smallest apprehension." Consult the Transactions of that active and distinguished association, the Medical and Chirurgical Society of London, vol. V. for more ample details.

The immunity of the constitution from a second attack of yellow fever is a peculiarity so strikingly characteristic of most disorders of an acknowledged specific nature, and of such great practical interest both in a social and political point of view, that it is extraordinary it should have met with so little notice before Professor Arejula made mention of it in the year 1806. Dr. Pym, however, enjoys the reputation of being the first English physician who promulgated this principle. I have not the sources of information at hand to enable me to determine how many of the writers on the malignant fever, as it has prevailed in our country, have entertained this opinion, though I well recollect Dr. Lining to have been one ; as may be seen in his account of the fever of Charleston, published more than sixty years ago in the Edinburgh Physical and Literary Essays, volume second. In the interesting correspondence on the yellow fever which was maintained a short time anterior to this period by Dr. John Mitchell of Virginia, and Lieutenant Governor Colden of New-York, nothing is alluded to from which we might infer their knowledge of this law of the disorder. See the American Medical and Philosophical Register, vols. 1st and 4th. In the Facts and Observations of the College of Physicians of Philadelphia, on the nature and origin of the pestilential fever, after establishing the identity of the yellow fever which existed in that city in 1793, 1797, and 1798, with the West India pestilence, the College state, that it is a circumstance that deserves particular attention, that "very few, if any, of the Creole French in this city, [Philadelphia,] suffered from the contagious malignant fever which prevailed here in 1793, 1797, and 1798, though the disease was introduced into their families; and children born in this country of Creole parents, died with it last autumn, while the parents and the children born in the West Indies were entirely exempt from it." We look in vain, if my memory serves me, for any thing of the same sort in the Additional Facts and Observations, a subsequent publication of the College of Philadelphia.

In his Sketch of the malignant contagious fever, as it appeared in the same city in 1793, Dr. Cathrall observes, "it does not appear to affect the same person twice. Although careful inquiry," adds he, "has been made by several of my medical friends and myself, it only appears that some of the patients had a slight relapse of fever, but without any of the distinguishing symptoms of the disease, and very soon recovered." It is much to be regretted that the several histories of this disease published by that able medical annalist, the late Dr. Rush, should have been so confused and unsatisfactory on so momentous a matter. In his account of the bilious yellow fever of 1793, you will, nevertheless, find, that the refugees from the French West Indies "universally escaped the disorder." On the other hand, Dr. Currie of Philadelphia, in his treatise on the Synochus Icterodes, states, that several instances occurred of the disease affecting the same individual a second time, and under circumstances so unequivocal that it could not be fairly ascribed to a relapse. This assertion, you will see, is not strongly made, and may be deemed rather matter of opinion than matter of fact. But at present I am not duly prepared to enlarge on this point, by reference to American authorities.

Dr. Pym has referred me to a passage in Sauvages on this disease, in which it is asserted that it operates upon the constitution but once. "Typhus icterodes contagiosus est. Albos tantum, maxime peregrinos ex regionibus frigidis advenas, Indos, Hybridos, mulatros omnes, exceptis infantibus, una tantum vice afficit: nigri vero ab eo morbo nunquam afficiuntur." See Nosologia Methodica, tom. I. p. 316 of the quarto edition of 1768. Does your own extensive experience in the malignant epidemics of New-York, agree with the opinion that the human constitution is invulnerable to a second attack of yellow fever, and corresponding in this respect with small-pox, and other specific disorders? In answer to this question, which has been frequently put to me by practitioners of medicine in England, I have uniformly ventured to assert that it holds good as a general fact. Those who have once had the disease are certainly less susceptible of its influence a second time.

Permit me now to make known to you the important results of the recent deliberations of two of the most distinguished medical associations of this kingdom. The decisions of the Royal College of Physicians of London, and of the Army Medical Board are at length brought to a close. These two learned bodies, alike distinguished for a scientific attainment and practical knowledge, have been for a considerable time past devoted to a consideration of all the facts connected with the nature and character of the yellow fever, particularly as it has of late years appeared in Spain. The Royal College have pronounced that the yellow fever is a highly contagious disease, which decision they have reported to the Lords of the Privy Council. With respect to its attacking the human frame but once, they say they think it extremely probable, but that upon a point of such importance they cannot venture to give a decided opinion. The Army Medical Board, at the head of which presides Sir James M'Gregor, have also given it as their opinion, that the yellow fever is in its nature contagious; and they further add their conviction, that the fever of Spain is not only strictly contagious, but that, like other disorders of a specific character, it affects the human frame but once. I have been kindly favoured with an abstract of these proceedings, and I herewith enclose an extract from the official report upon Dr. Pym's publication, by the Army Medical Board. The operation of climate, soil, and other local causes, in adding virulence to febrile contagion, may be considered almost an axiom in physic; and the necessity of a strict adherence to your improved system of quarantine laws, and all municipal regulations for the purposes of domestic cleanliness, cannot be too strongly enforced. On this subject the Royal College and the Army Medical Board are united in opinion.

COPY.

Extract from the Report upon Dr. Pym's publication by the Army Medical Board.

"Army Medical Board Office, 6th May, 1816.

"It is due to Dr. Pym to state, that we consider him to have been the first English medical man who promulgated the opinion, that the disease in question, (the Bulam fever,) is capable of attacking the human frame but once; and if that opinion be correct, which we believe it to be, it is certainly an important fact, and led Dr. Pym to employ those persons as attendants on the sick, who had undergone the disease, and therefore were not likely to be affected by the contagion of it, and thus probably saved many lives.

Under these impressions, we beg leave to recommend the industry and research displayed by Dr. Pym in his book to Lord Palmerstone's favourable consideration.

" Signed,
" J. M'GREGOR,
" W. FRANKLIN,
" W. SOMERVILLE."

The advocates for the unity of diseases will, I believe, find it insuperably difficult to reconcile with their theory the facts which I have thus hastily communicated to you; while the fundamental principle, that there is a radical difference between remitting fever and yellow fever, between fevers depending upon marsh miasms as their source, and those that take their rise from human contagion; in short, that yellow fever is a distinct idiopathic disease, acquires additional support. It may not therefore be of disservice to make known the purport of this letter. The doctrine maintaining that different fevers are of one common origin is in reality so unfounded in fact, and so pernicious in its consequences, that the sooner it is discarded the better will it be for the interests of humanity.

Before I conclude, permit me to add a few lines on a subject not wholly foreign to the nature of this letter, the plague. The account of the origin and progress of the plague in the island of Malta, in the year 1813, drawn up by Dr. Calvert, physician to the forces, and printed in the 6th volume of the Transactions of the Medical and Chirurgical Society of London, is a document of great value. The reasoning of the author, deduced from the evidence which a faithful narrative affords, seems to be very satisfactory. Contact, he maintains, is the most certain mode of communicating the disease, but he is inclined to deny that it is essential to the propagation of the contagion.

The various reports that have been so industriously circulated concerning the contagiousness and non-contagiousness of the plague, especially as it prevailed in the army of the East, and the contradictory statements that have been made relative to Baron Desgenettes, induced me, while in Paris in the spring of 1816, to seek an interview with that gentleman, in order to ascertain the truth on this interesting subject. The Baron distinctly declared that it had ever been his settled opinion that the plague was a contagious disorder; that his extensive experience as an officer of the medical staff, had only served to confirm him in that opinion; and further expressed much surprise, that any account should have been made public representing his views in a different light. The Baron inoculated himself with the matter of plague, though he felt persuaded that the disease was of a specific character, and had almost hourly evidence of its contagious effects: but more fortunate than the incredulous Whyte, he did not fall a victim to the experiment.

I am aware how confidently the case of Dr. Whyte has been denied. So far however from any doubt being entertained by the medical philosophers here, as to the accuracy of the statement of his inoculating himself with the matter of plague, it is well known that his preconceived notions of the nature of that pestilence were the cause of his rashness and premature death. Of this I have been assured by personal communication with Sir Gilbert Blane and Sir James M'Gregor.

When I took pen in hand, I did not expect to produce so long and tedious a letter. My apology must be the nature of the subject, interesting, beyond all others, to an American physician.

With due respect, I remain, dear Sir,

Your Friend,

JOHN W. FRANCIS.

Since the receipt of the foregoing letter from Dr. Francis, stating the decisions of the Royal College and the Army Medical Board, I have made the inquiry among those physicians who have been most conversant with the yellow fever, as it has appeared in the cities of New-York and Philadelphia, more especially since the year 1791, and in no satisfactory instance, have I found a practitioner who has met with the disease a second time in the same individual. During a visit made to Philadelphia in October 1816, I had an opportunity of conversing on this subject with Dr. Kuhn, the President of the College of Physicians of Philadelphia; that venerable physician informed me, that he had never seen an instance in which the same person experienced a second attack of yellow fever, and added, that in several instances, those who had been affected with that disorder, when it prevailed in Philadelphia in 1762, altogether escaped it in its late visitations, although they were exposed to the contagion in their own families, and particularly so in their own personal and unremitted attentions to the poor, particularly in the fatal epidemic of 1793. Dr. Kuhn cited, among others, the names of Thos. Penrose and Wm. Clifton, as the most distinguished of the good Samaritans that administered to the relief of the poor on that memorable occasion.

Mr. John Vaughan, with his characteristic activity and benevolence, was in like manner exposed to the contagion during the last mentioned epidemic, and altogether escaped its influence; this exemption he believes was to be ascribed to an attack of the disease which he had long prior to this time suffered in Jamaica, W. Indies. Dr. Wistar, the late Professor of Anatomy in the University of Pennsylvania, believed the same principle to be generally or rather almost universally true:—he had met with a few instances, which he considered well authenticated cases, in which the individuals suffered a second attack, but such instances, he concluded, were of equally rare occurrence as a second attack of small-pox, or of other diseases of acknowledged specific contagion. Dr. William Currie, of Philadelphia, concurs in the opinion, that the yellow fever affects the human frame but once.

In an answer to a letter, recently addressed to Dr. Griffiths, of Philadelphia, the following facts are communicated to me. "Respecting the question of re-infection in the disease called yellow fever my mind has been long made up. I have never seen an instance of its occurring twice in the same person, during the seven periods of its occurrence among us; and as I was absent from the city only two weeks in 1793, whilst it was prevalent, and at no other time, my opportunities of making observations of this kind were abundant."

Similar will be the result of an examination into the character of the yellow fever, as it has prevailed in New-York: many of my fellow-practitioners, (among whom I may mention Dr. Hugh M'Lean, and the late Dr. R. S. Kissam,) who have had ample experience in the disease, have assured me, they have never attended the same individual in a second attack of it.—I personally witnessed the ravages of the pestilence during its occurrence at different years in this city, since 1795 inclusive: nor have I at any time been absent during its most alarming mortality. I suffered an attack of the disorder in 1798, and have since escaped its influence. Among the memoranda I have made of the fever of 1795, 1796, 1797, 1798, 1801, 1803, 1805, 1819, and 1822, the years it was most fatal, not a solitary case do I find of a second attack in the same person. In Dr. Townsend's account of the yellow fever, as it prevailed in the city of New-York in the summer and autumn of 1822, (see p. 247) many additional facts are related in proof that the constitution is *generally* invulnerable to the operation of the contagion of yellow fever a second time.

END OF VOL. I.